The Relations of General Intelligence to Certain Mental and Physical Traits

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Assistant Professor of Elementary Education, College for Teachers, University of Cincinnati

Sometime Fellow in Education, Teachers College, Columbia University

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, in the Faculty of Philosophy, Columbia University

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THE RELATIONS OF GENERAL INTELLIGENCE TO CERTAIN MENTAL AND PHYSICAL TRAITS

CHAPTER I

INTRODUCTION

This series of studies represents data collected and tests made upon about 430 feeble-minded children of the Indiana School for Feeble-Minded Youth at Fort Wayne and 480 normal children of the Caldwell, New Jersey, public schools. The first group was measured during the spring of 1910, the second group the last week of May and first week of June 1912. Among other data and tests, physical and mental, the following were collected at the Indiana School while the author was principal of the schools of the Institution:

Age and mental classification.

Age at which these children began to walk and talk.

Height in inches.

Weight in pounds.

Strength of grip with right and left hands.

Dextrality, or the preference or superiority of one hand over the other.

Pulse.

Temperature at the beginning and close of a half-day school.

Muscular control by maze tracing, balance beam walking, ball rolling, and tracing over a scale.

Ability in perception by marking A's and a-t words.

Memory of related and unrelated words.

Ability to form abstract notions with the "noun" test.

Power of association.

The Caldwell school children were measured or examined by the author under as nearly similar conditions as were possible.

The following tests were given:

Age and school grade classification.
Height in inches.
Weight in pounds.
Strength of grip with right and left hands.
Dextrality (in the sense used above).
Maze tracing.
"A" letter perception and a-t word perception.
Memory of related and unrelated words.

In addition to the above, the ages of walking and talking were obtained for twenty-five boys and twenty-five girls, sons or daughters of graduate men in Columbia University. The strength of grip was taken with thirty-three graduate students, also of Columbia. For the purposes of this study the material was organized into four chapters, as follows:

The Age of Walking and Talking in Relation to General Intelligence.[1]

Height and Weight of Children in Relation to General Intelligence.[2]

Strength of Grip and Dextrality in Relation to General Intelligence.

Perception and Memory in Relation to General Intelligence.

The results with the balance-beam and ball-rolling and a-t perception do not appear. The other data not bearing directly upon the studies above have been included in the tables of Chapter VI, with the hope that some one interested may find material for a further comparative study or for purposes of correlation of the various physical and mental traits.

The numbers for bibliographical references refer in each case to the bibliography at the end of the chapter in question.

The writer wishes to acknowledge his obligations to Professor Edward L. Thorndike for helpful suggestions, aid, and encouragement in this study. He is indebted to the Editor of the *Pedagogical Seminary* for courtesies in connection with the reprinting of Chapters II and III.

[1] This chapter has appeared elsewhere in *Ped. Sem.*, December, 1913.
[2] This chapter has appeared elsewhere in *Ped. Sem.*, September, 1914.

CHAPTER II

THE AGE OF WALKING AND TALKING IN RELATION TO GENERAL INTELLIGENCE

It is an accomplishment long to be remembered in the family circle when the child first stands on his feet, and takes the "first step," or when he first babbles an intelligent word in which the idea is associated with the object. May it not well cause concern if the ripening of either of these instincts be long deferred? The writer was impressed, while examining the entrance blanks of children in one of our state institutions for feeble-minded, with the apparent lateness at which these children walked and talked. The question arose as to whether or not "general intelligence" played a role in the development of these tendencies. Kirkpatrick (4) says that "philologists and others interested in the origin of language and the development of intellect find very striking analogies between the development of speech and intelligence in the race and in the child." It shall be the purpose of this study to offer data obtained on the point in question. In order to establish "norms" for comparison, the results of a subsequent study will be given first: viz., the age of walking and talking as manifested in the "bright, normal child."

The children of the first group, referred to hereafter as "normal" children, are 25 boys and 25 girls, chiefly of Teachers College graduate men, with a few children of undergraduate men and several of Columbia College graduate men. A few are children of professors. The data were obtained during the springs of 1911 and 1912. Only seven children were over 9 years of age, none was over 15 years of age, the average being a little less than 6 years. These children represent thirty different families. The question and instructions given to the father were:

"At what age, nearest month, did your child begin to walk and talk?

"Walking means: to take a step unassisted.

"Talking means: to use a word intelligently: i.e., to associate the idea with the object."

The answers were in almost all cases verified by the mother. It might be remarked that, of the first forty children obtained at

random, 22 were boys and 18 were girls. Preference was then given to girls in order to make the distribution equal. Table I shows the age (years) of the child when the data were obtained, and the nearest month at walking and talking.

TABLE I

NORMAL CHILDREN

Boys	Age	Walked Nearest Mo.	Talked Nearest Mo.	Girls	Age	Walked Nearest Mo.	Talked Nearest Mo.
1	4	14	18	1	4	14	17
2	2.5	13	18	2	3	18	16
3	14	14	17	3	6	13	16
4	8	15	20	4	2.5	15	18
5	12	16	9	5	15	13	18
6	7	11	9	6	9	17	14
7	9	12	18	7	1.5	14	17
8	7	15	21	8	2	12	17
9	9	15	20	9	2	13	15
10	12	13	16	10	7	11	18
11	7	12	12	11	2	12	18
12	5	30	25	12	2	14	18
13	5	12	18	13	3	15	10
14	8	13	10	14	15	13	12
15	7	11	11	15	6.5	13	15
16	1.5	14	14	16	11	12	14
17	10	14	15	17	died	12	16
18	2	14	15	18	3	12	24
19	9	15	17	19	5.5	13	12
20	7	14	16	20	2.5	16	10
21	4	13	19	21	7	11	9
22	2	14	15	22	6	14	12
23	5	16	13	23	4	13	12
24	6	13	18	24	5	12	10
25	2.5	14	10	25	4	15	14

NOTES ON TABLE I. WALKING AND TALKING.

1. Of 50 boys and girls, 17 began to talk before they began to walk, 11 girls and 6 boys.

Three began in the same month; these three were boys.

2. Boys 3 and 4 are brothers. The latter learned to walk on hard wood floors, while the former had matting. Girl 2 had polished floors.

3. Boy 12 began to walk and talk later than usual for normal children. During his early years he was not a very strong baby. At 4.5 years, adenoids and tonsils were removed. His father says for two years previous, the boy had never had a restful night. He is known personally to the writer and is an especially bright lad.

4. Girl 25 was a very heavy child.

TABLE II

FREQUENCY TABLE. NORMAL BOYS

Walking		Talking	
Months	Frequency	Months	Frequency
11	2	9	2
12	3	10	2
13	5	11	1
14	8	12	1
15	4	13	1
16	2	14	1
		15	3
		16	2
		17	2
		18	5
		19	1
		20	2
		21	1
30	1	25	1
11 means 10.5 to 11.5 months.		9 means 8.5 to 9.5 months.	
N=25		N=25	
Median=13.875		Median=16.5	
Guessed Average=14		Guessed Average=16	
True Average=14.28		True Average=15.76	
A.D.= 1.64		A.D.=3.2	
25 percentile=12.75		25 percentile=12.75	
75 percentile=14.69		75 percentile=18.25	
Q.= .97*		Q.= 2.75*	

* Approximate P.E. obtained by calculating the semi-inter quartile range.

From Table II we see the age that normal boys begin to walk and talk; and from Table III the same for normal girls. Figures 1 and 2 show the distribution curves for the same. Judging from the general tendencies of 50 cases, we might say that:

1. Boys begin to walk at 13.875 months (using the median as a measure of central tendency), with a probable error of .97 month; and begin to talk at 16.5 months, with a probable error of 2.75 months.

2. Girls begin to walk at 13.21 months, with a probable error of 1.12 months; and begin to talk at 15.5 months, with a probable error of 2.68 months.

3. Girls walk and talk a little earlier than boys. The same is true if we judge from the average accomplishment of 50 children. Using the A.D. as a measure of variability, boys are more variable than girls.

TABLE III

FREQUENCY TABLE. NORMAL GIRLS

Walking		Talking	
Months	Frequency	Months	Frequency
11	2	9	1
12	6	10	3
13	7	11	0
14	4	12	4
15	3	13	0
16	1	14	3
17	1	15	2
18	1	16	3
		17	3
		18	5
		24	1
11 means 10.5 to 11.5 months.		9 means 8.5 to 9.5 months.	
N=25		N=25	
Median=13.21		Median=15.5	
Guessed Average=13		Guessed Average=15	
True Average=13.48		True Average=14.88	
A.D.= 1.28		A.D.= 2.76	
25 percentile=12.21		25 percentile=12.06	
75 percentile=14.44		75 percentile=17.42	
Q= 1.12		Q= 2.68	

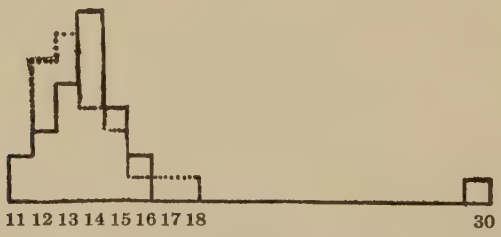

FIG. 1. Surface of frequency (months) for Walking
Normal Boys—— 25
Normal Girls 25

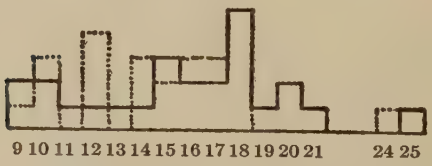

FIG. 2. Surface of frequency (months) for Talking
Normal Boys—— 25
Normal Girls 25

TABLE IV

FREQUENCY TABLE. NORMAL CHILDREN—BOYS AND GIRLS

Walking		Talking	
Months	Frequency	Months	Frequency
11	4	9	3
12	9	10	5
13	12	11	1
14	12	12	5
15	7	13	1
16	3	14	4
17	1	15	5
18	1	16	5
		17	5
30	1	18	10
		19	1
		20	2
		21	1
		22	0
		23	0
		24	1
		25	1
11 means 10.5 to 11.5 months.		9 means 8.5 to 9.5 months.	
N=50		N=50	
Median=13.54 months[1]		Median=15.80 months[2]	
Guessed Average=14		Guessed Average=16	
True Average=13.88		True Average=15.32	
A.D.= 1.56		A.D.= 3	
25 percentile=12.44		25 percentile=12.20	
75 percentile=14.57		75 percentile=17.85	
Q= 1.06		Q= 2.83	

Table IV shows the age that 50 normal boys and girls, combined, begin to walk and talk. Figures 3 and 4 show the distribution curves for the same. It may readily be seen that children in general (judged from 50 cases at random) are more constant in beginning to walk than in beginning to talk. One is a much more evident trait than the other. There is more

[1]By the formula

$$\text{P.E.}_{\text{t. av.-obt. av.}} = \frac{\text{P.E.}_{\text{dis.}}}{\sqrt{n}}$$

the chances are 999 to 1 that the true median will not differ from the median obtained by more than .72 months.

See Mental and Social Measurements (1904) Thorndike, p. 139, on the "Reliability of an Average" (or median).

[2] The chances are 999 to 1 that the true median will not differ from the median obtained by more than 1.92 months.

chance in the latter of the observer being uncertain or biased. Again, there is a more constant performance in physical traits for people in general than for all people in the more intellectual traits. The beginning of speech might be classed as more of an intellectual characteristic than beginning walking. That comparison might be had between the performance of normal children in general, and individual children in particular, the abbreviated diaries of the maturing of the walking and talking instincts in several "bright" children are recorded. That of Preyer (14 and 15) is given first.

FIG. 3. Surface of frequency (months) for Walking 50 Normal Boys and Girls

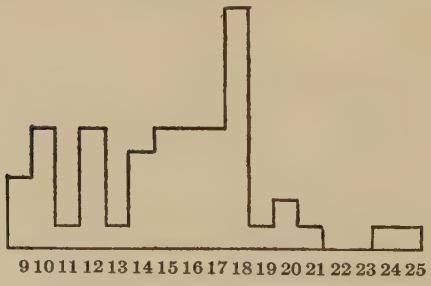

FIG. 4. Surface of frequency (months) for Talking 50 Normal Boys and Girls

Walking, pp. 267–278:

1. "In the 22d week the child (boy) actually raised himself to a sitting posture . . . but it was not till the 39th week that he could sit alone for any length of time; then he liked sitting, but not without support. . . . Finally in the 42d week the child sits up in the bath, without support. . . . From the 11th month, sitting becomes a habit for life."

2. "The first successful attempts to stand, . . . without support, but only for a moment, were made in the 39th week, . . . In the 11th month he can stand without any support, and even stamps with his foot, but for all that he is not at all sure on his feet."
3. 48th week—(11.2 mo.) pushes a chair.
4. 53rd week—creeps, but can not walk alone.
5. 63d week—"The child still walks only when he can hold on with both hands."
6. 65th week—"Cannot yet walk alone."
7. 66th week—"Suddenly, on the 457th day (15.2 mo.), the child can run alone. The day before he was entirely unable to take three steps alone. . . . Now he can run around a large table." ("And from that day forth he could walk upright." p. 275.)

Talking, pp. 77–165: (see "Conspectus" by Brown at beginning.)

1. Does not repeat monologue syllables after any one at 10th month.
2. "Some syllables emphatically pronounced to child were for first time correctly repeated in 11th month."
3. Ability to discriminate between words in 12th month.
4. "The most important advance consists in the now awakened understanding of spoken words." 13th month.
5. "Here at the beginning of the 14th month is the idea of a definite stationary object associated with a sound heard, as so strongly that it is able to produce an independent act of locomotion, the first one."
6. Advance in repeating syllables in 15th month.
7. Touches eye, ear, etc., when these are named, not with certainty. Understands "bring," "give," etc., in 16th month.
8. "Astonishing progress in understanding what is said. Few expressions of his own with recognizable meaning." 21st month.
9. "The 23d month brought at length the first spoken judgment." (Said "heiss" when his milk was too warm.)
10. Combination of two words into a sentence at 24th month, 707th day.
11. 810th day (27th month), gave his own name for the first time in answer to a question.

WHIPPLE, G. M. (25)

Walking:

1. Richard, son of Prof. W., "crept backwards, 6 mo.; creeping forward perfected, 7.5 mo.; first stood by holding with but one hand, 9.5 mo.; walked by holding with hands, 9.7 mo.; stood alone, 11 mo.; first step alone at 13.5 months; ten steps alone, 5 days later."

Talking:

1. "Said 'mama' at 7.5 months but this may have been mere accident. Imitation began to be very active at 9 mo.; date of pronouncing first word unknown. Meaning of a phrase understood at 9 mo.; four words pronounced at 11.5 mo.; 15 words had been used at 1 year; 6 word sentences were used at 20 mo."
2. Words known and used by R. at 3d birthday about 1,800.[1]

[1] For a condensed table of the number of words used by individual children from 16 mo. to 4 yrs. of age, see Whipple, p. 17, *Ped. Sem.*, Vol. 16, 1909. Also see Heilig, p. 1, *Ped. Sem.*, March, 1913; Rowe, p. 187, *Ped. Sem.*, June, 1913.

MAJOR, D. R. (10)

Notes on son's learning to stand and walk—pp. 347-350:

1. "Stood in a leaning, tottering position," holding to chair, in 46th week (316th day).
2. "Stood unsupported two or three seconds during 60th week."
3. "Walked ten feet, holding to crib, on 385th day." (12.8+month.)
4. "Two or three steps without support, 434th day." (14.5—month.)
5. "Walked about 3 feet, without support, 445th day." (14.8+month.)

Talking: p. 318.

1. "A great advance in the 15th month was in the appearance, for the first time, of the independent use of words or sounds to designate things the child saw or heard. The sight of the object or the sound which the child recognized called forth the name or word which had been associated with it."

HALL, MRS. W. S. (2)

Notes on son—*Walking*, pp. 403–404:

1. Crept forward at 405th day—(57th week—13.5 month).
2. Stood with support of finger at 38th week.
3. Stood at chair for five minutes at 48th week.
4. "While standing by a chair (364th day—52nd week—12.13 month) accidentally pushed it forward and followed it to keep his support."
5. "On same day he stood alone for half a minute."
6. "In the 60th week (415th day—13.8 months) he could walk quite steadily when supported by one hand."
7. "Took first unaided step," 428th day (14.2+month).
8. "Took ten independent steps," 435th day.

Talking, pp. 467–591:

1. "Recognized and imitated sounds from street"—44th week.
2. The word "bye-bye" used unexpectedly at 260th day. (33d week; 8.6+month.)
3. "Said 'papa' as father entered room." 291st day. (9.7 month.)
4. "Bath, box, shoe (326), gone (331), and paper (333) were first imitated and in a few days used independently. The next word, doll, was first used spontaneously as a doll was put into his hands." (335th day—11.2 month.)
5. "First sentence, 'Papa gone,' 338th day."

SHINN, M. W. (19)

Notes on niece: Miss Shinn says: "She was born two weeks late—a point that may have some bearing on the rapidity of early development." p. 5.

Walking, pp. 344–360:

1. "On the 267th day (8.9 month), the last of the 38th week, some one looked up from dinner to see the baby standing by a lounge, merely steadied by one hand pressing it, while she waved the other with joy and pride."
2. "On the 279th day (9.3 month), for the first time, . . . she repeatedly stood quite alone for several seconds."
3. "On the 285th day (9.5 months), she deliberately experimented in standing alone as long as she could."
4. "On the 292d day (9.7 months), kept her balance for about a quarter of a minute."
5. "She appears to have continued to edge along a few steps now and then when holding by a chair, and after the 309th day (10.3 months), would step the length of a lounge, holding on with one hand."
6. "On the 353d day (11.8 months), I was told that she had walked three or four steps, and this time spontaneously."
7. "On the first day of the 54th week (372d day; 12.4 months) I saw her walk about three feet alone."
8. "On the 376th day (12.5 months) I was told that she walked alone across a room, some twelve feet, quite spontaneously."

"Good Observations (concerning the acquirement of speech) were first supplied in Germany by Berthold Sigismund in his pamphlet 'Kind und Welt,' 1856; but his observations were scanty. . . . The observations of Sigismund are remarkable for their objectivity, their clearness of exposition, and their accuracy." (Preyer, "The Development of the Intellect," Appendix A, p. 221–23.) A few of his observations are given.

"The first imitation of sounds, proved to be such, were made after the age of eleven months."

"At the age of nine months he distinguished accurately the words 'father, mother,'" etc.

"The first word imitated by the child of his own accord (after fourteen months) was the cry of 'neuback' (freshbake), as it resounded from the street; it was given back by the child, unsolicited, as ei-a."

For comparison, the individual observations on these five children are given in table form. A much wider range, and of course uncertainty, is noted in the beginning of words. In the data collected on the 50 normal children, judging from such expressions as "bye-bye" and pa-pa" was discouraged.

The children of the second group, referred to hereafter as "feeble-minded" children, represent the results of an examin-

	Median Age (Months) Beginning to Walk[1]	Median Age (Months) Beginning to Talk[2]
50 Normal Boys and Girls.	13.50	15.70
	P.E. 1.06	P.E. 2.83
Baby Shinn	11.8	....
Baby Whipple	13.5	11.5 (4 words)
Baby Hall	14.2	(11.2)
Baby Major	14.5	14.+
Baby Preyer	15.2	22.+

[1] "Beginning to walk," meaning "to take a step unassisted."
[2] "Beginning to talk," meaning "to use a word intelligently, associating idea with object."

ation in 1910 of something less than 400 personal descriptive entrance blanks of "schoolable" cases (lower grades were eliminated) in the Indiana School for Feeble-Minded Youth, an institution of something over 1,200 enrollment. Many of the entrance records did not give the age at which the child began to walk and talk, but from those complete, the age was obtained for:

	Walking	Talking
Boys	84	56
Girls	60	36
Total	144	92

The tendency of the parent, physician, or guardian filling the blank was to answer the questions:

"At what age did the child commence to walk?"
"At what age did the child commence to talk?"

in half and whole years, as "1½–2–2½," etc., or, "between 2 and 2½," etc. Only a few records gave the month, hence the age was taken from the records at the nearest quarter year. For example: if the month was given as "17," entry was made "1½" years; if the month was given as "19," entry was made "1½" years. The quarter years are thrown, half and half each way, in the frequency tables, and in plotting. In case of an odd number of frequencies on the quarter year, the "larger half" was thrown to the lower, or earlier group, hence the figures tend

to be more conservative. Such answers as, "at the common age," "at the normal age," "very slow," were not used. Cripples of course were not counted.

That the peculiarities of speech in feeble-minded children in general might be seen, the first 100 boys and girls, all grades, "schoolable" and "non-schoolable," as taken from the institution entry book, Jan. 1, 1908 to Sept. 20, 1908, are here tabulated. In answer to the questions on the application blanks: "Is the speech perfect?" "What peculiarities of speech are there?" "Is he dumb?" the following was noted:

	Number	Defective in Speech but not Dumb	Per cent.	Dumb	Per cent.
Boys....	61	22	36	7	11.5
Girls....	39	15	38.5	7	18

Table V shows the age, nearest quarter year, at which feeble-minded children commenced to walk and talk.

TABLE V

FEEBLE-MINDED CHILDREN

Boys	Walked Nearest ¼-Year	Talked Nearest ¼-Year	Girls	Walked Nearest ¼-Year	Talked Nearest ¼-Year
1	2	Dumb	1	....	4
2	3.5	...	2	4	4
3	4	5	3	1.5	1.5
4	1.25	3	4	....	2
5	3.5	3	5	3	....
					....
6	3	Dumb	6	3.5	....
7	4	2	7	6	Dumb
8	1.25	5	8	1	....
9	3	4	9	1.5	3
10	2	1.5	10	2.5	2
11	2	3	11	4	3
12	4	...	12	5	7
13	4	2	13	1.5	2
14	3	3	14	2	4
15	1	1.5	15	....	13
16	1.5	1.5	16	1.5	....
17	4	6	17	2	....
18	2.5	2.5	18	2	2.5
19	1	2	19	.75	....
20	2	4	20	2	....

TABLE V—*Continued*

Boys	Walked Nearest ¼-Year	Talked Nearest ¼-Year	Girls	Walked Nearest ¼-Year	Talked Nearest ¼-Year
21	1.25	4	21	1	....
22	1.25	2	22	2	2
23	3	Dumb	23	1	1
24	2	3	24	1.5	....
25	1.5	4	25	1	1
26	3	1	26	4	....
27	....	1	27	2.75	....
28	2.5	...	28	2	....
29	2	3.5	29	1.5	....
30	1.5	1.5	30	1.5	....
31	1	1.25	31	1	1
32	2	....	32	1	....
33	1.5	....	33	2	....
34	3	....	34	1	....
35	1.5	3	35	4	....
36	2.25		36	....	1.5
37	2.25	3.5	37	3	3
38	1.5	5	38	....	5
39	1.5	....	39	1	..
40	1.5	2	40	1	2
41	2	....	41	1	3
42	2.5	....	42	2	4
43	1	....	43	2	....
44	1.25	....	44	1.25	....
45	2	....	45	1.5	1.5
46	1.5	3	46	1.5	....
47	1	2	47	1.25	3
48	1.5	2	48	....	2
49	3	4	49	2.5	2
50	1.5	3	50	4	6
51	1.5	1	51	1	3
52	3.5	....	52	1	7
53	1.25	....	53	2	....
54	4	3	54	2.5	2
55	1.25	2	55	2.5	....
56	2	....	56	1	1
57	1.25	....	57	1.5	2
58	....	5	58	1.25	
59	1.5	....	59	4	....
60	2	4	60	1	3
61	1.75	3	61	1.5	2
62	1.5	2	62	2	....
63	4	4	63	2	Dumb
64	1.5	2	64	1.5	2
65	1.5	1.25	65	1.75	4
66	5	8	66	2	....
67	2.5	7			
68	1.5	....			

TABLE V—*Concluded*

Boys	Walked Nearest ¼-Year	Talked Nearest ¼-Year	Girls	Walked Nearest ¼-Year	Talked Nearest ¼-Year
69	1	....			
70	2	....			
71	2	....			
72	2	4.5			
73	....	2			
74	1.25	9			
75	1.25	3			
76	1	1			
77	1.5	....			
78	2.5	4.5			
79	2	9			
80	2.25	....			
81	4	....			
82	3	....			
83	1.25	....			
84	6	6			
85	2.5	3			
86	1.25	1.25			
87	1.25	1.5			

TABLE VI

FREQUENCY TABLE. FEEBLE-MINDED BOYS

Walking		Talking	
Years	Frequency	Years	Frequency
1	14	1	5
1.5	25	1.5	6
2	17	2	11
2.5	7	2.5	1
3	8	3	12
3.5	3	3.5	2
4	8	4	7
4.5	0	4.5	2
5	1	5	4
5.5	0	5.5	0
6	1	6	2
		6.5	0
		7	1
		7.5	0
		8	1
		8.5	0
		9	2
1 means .75 to 1.25 years.		1 means .75 to 1.25 years.	
N=84		N=56	
Median= 1.85		Median= 2.98	
Guessed Average= 2		Guessed Average= 3	
True Average= 2.15		True Average= 3.28	
A.D.= .78		A.D.= 1.37	
25 percentile= 1.39		25 percentile= 1.89	
75 percentile= 2.75		75 percentile= 4.14	
Q= .68		Q= 1.125	

TABLE VII

FREQUENCY TABLE. FEEBLE-MINDED GIRLS

Walking		Talking	
Years	Frequency	Years	Frequency
1	17	1	4
1.5	14	1.5	3
2	13	2	11
2.5	5	2.5	1
3	2	3	7
3.5	1	3.5	0
4	6	4	5
4.5	0	4.5	0
5	1	5	1
5.5	0	5.5	0
6	1	6	1
		6.5	0
		7	2
		13	1
1 means .75 to 1.25 years.		1 means .75 to 1.25 years.	
N=60		N=36	
Median= 1.73		Median= 2.50	
Guessed Average= 2		Guessed Average= 2.5	
True Average= 2.02		True Average= 3.11	
A.D.= .82		A.D.= 1.42	
25 percentile= 1.19		25 percentile= 1.84	
75 percentile= 2.35		75 percentile= 3.85	
Q= .58		Q= 1.00	

From Table VI we see the age that feeble-minded boys begin to walk and talk; and from Table VII the same for feeble-minded girls. Figures 5 and 6 show the distribution curves for the same. Judging from the general tendencies of 144 feeble-minded boys and girls in beginning to walk, and 92 feeble-minded boys and girls in beginning to talk, we might say that:

1. Feeble-minded boys begin to walk at 22.2 months (1.85 yrs. median) with a probable error of 8.16 months; and begin to talk at 35.76 months, with a probable error of 13.5 months.

2. Feeble-minded girls begin to walk at 20.76 months, with a probable error of 6.96 months; and begin to talk at 30 months, with a probable error of 12 months.

3. Feeble-minded girls walk and talk a little earlier than feeble-minded boys. This is true of normal girls and boys. The same is true in both groups if we judge from the average accomplishment. Using the A.D. as a measure of variability,

girls are a little more variable than boys. The P. E. would show the reverse.

Table VIII shows the age that feeble-minded boys and girls, combined, begin to walk and talk. Figs. 7, 8, and 9 show the

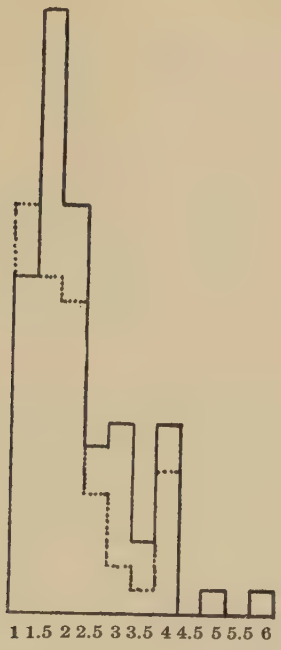

FIG. 5. Surface of frequency (half years) for Walking
Feeble-Minded Boys—— 84
Feeble-Minded Girls 60

distribution curves for the same. Comparing Tables IV and VIII, we see from the data at hand that normal children:

Begin to walk at 13.54 mo. (P. E. 1.06); begin to talk at 15.8 mo. (P. E. 2.83).

Feeble-Minded Children:

Begin to walk at 21.6 mo. (P. E. 7.56); begin to talk at 34.4 mo. (P. E. 12.8).

In other words, the median mentally defective child (schoolable) walks 8 months, and talks 18.6 months later than the median normal child walks and talks.

Many of the investigations into children's walking and talking have been physiological in nature; they have dealt with the

manner of acquiring locomotion or speech, and children's vocabularies at two, three, four years of age, etc. The writer knows of no other study in which the time of the ripening of the walking and talking instincts in groups of children has been made the basis of a statistical research.[1] Some years ago Dr. Ireland (3) in England calculated the average time that "idiots" began walking and talking. The term "idiot" has, in time past, in Europe, been used to represent a low form of mental deficiency.

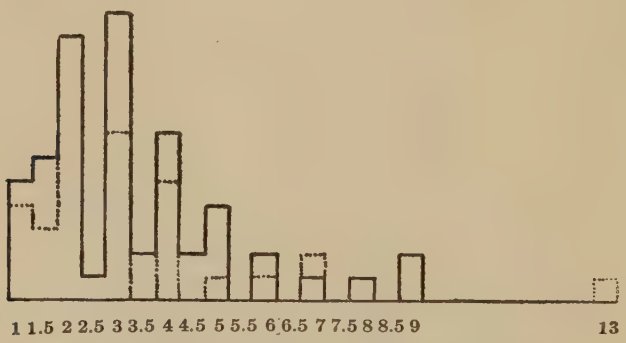

FIG. 6. Surface of frequency (half years) for Talking
Feeble-Minded Boys—— 56
Feeble-Minded Girls 36

The term is still used broadly to include even high-grade defectives, while in this country milder and softer terms are applied, that of "moron," "mentally defective," or "imbecile" children. The "idiots" in the institutions of England were generally of

[1] The following reference came to the author after this article had been submitted to *Ped. Sem.* for publication:

Table III showing the average ages at which five different classes of feeble-minded children commenced to walk and talk. "Good," "Medium," and "Bad" refer to the mental capacity as estimated by the teacher. "Defective speech" comprises consonantal anomalies (excluding "f" for "th") lisping and marked stammering.

Classification of Case	Average age, Walk	Average age, Talk
61 cases classed as "Good"	1.5 yrs.	1.8 yrs.
44 cases classed as "Medium"	1.8 "	2.0 "
50 cases classed as "Bad"	2.2 "	3.5 "
88 cases with good speech	1.6 "	1.9 "
64 cases with defective speech	2.2 "	3.2 "

C. Paget Lapage: Feeblemindedness in Children of School Age, p. 80, Manchester University Press, 1911.

the lower types of feeble-mindedness, none of which type would be included in the group of "schoolable" feeble-minded children who constitute the second group of this study. That the conservative nature of this research might be seen, and that, in a broad way, three groups of children representing differing degrees of mentality might be contrasted, we note the observations of Ireland (p. 323).

"He (the healthy child) generally begins to walk from the 12th to the 18th month. The first appearance of speech is variable: words generally come from the first to the second year, but if the child is mute after two years we may suspect there is something deficient. Such is the ordinary course in healthy infancy; but with idiots this evolution of the senses and motor powers is much slower, and often irregular. . . . In general, imbecile children are awkward in their motions and slow at beginning to walk."[1]

"Merely backward children are widely distinct from idiots. They are of slow growth, physical and mental; they are late in walking and in speaking, but show no sign of brain disease."

TABLE VIII

FREQUENCY TABLE. FEEBLE-MINDED BOYS AND GIRLS

Walking		Talking	
Years	Frequency	Years	Frequency
1	31	1	9
1.5	39	1.5	9
2	30	2	22
2.5	12	2.5	2
3	10	3	19
3.5	4	3.5	2
4	14	4	12
4.5	0	4.5	2
5	2	5	5
5.5	0	5.5	0
6	2	6	3
		6.5	0
		7	3
		7.5	0
		8	1
		8.5	0
		9	2
		13	1
1 means .75 to 1.25 years.		1 means .75 to 1.25 years.	
N = 144		N = 92	
Median = 1.8 (21.6 mos.[2])		Median = 2.87 (34.44 mos.[3])	
Guessed Average = 2		Guessed Average = 3	
True Average = 2.09		True Average = 3.21	
A. D. = .8		A. D. = 1.4	
25 percentile = 1.31		25 percentile = 1.86	
75 percentile = 2.58		75 percentile = 4.00	
Q = .63 (7.56 mos.)		Q = 1.07 (12.84 mos.)	

[1] Ireland, Mental Affections of Children. p. 395.

[2] By the formula

$$\text{P.E.}_{\text{t. av.-obt. av.}} = \frac{\text{P.E.}_{\text{dis.}}}{\sqrt{n}}$$

the chances are 999 to 1 that the true median will not differ from the median obtained by more than 3 months.

[3] The chances are 999 to 1 that the true median will not differ from the median obtained by more than 6.43 months.

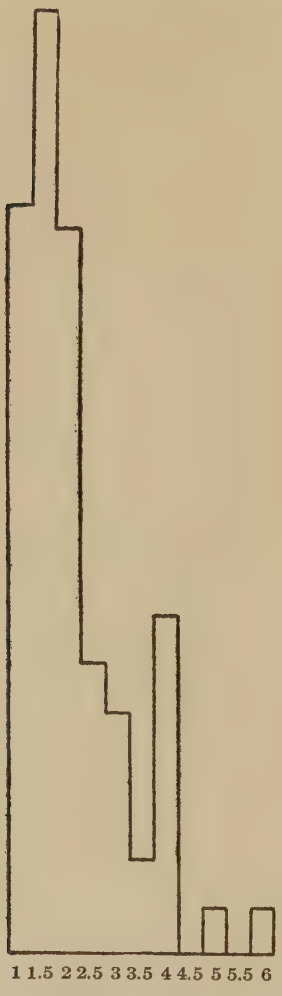

FIG. 7. Surface of frequency (half years) for Walking 144 Feeble-Minded Boys and Girls

The average age at walking of 111 cases of "imbecile" children investigated by Dr. Ireland was 2.5 years. Only five began to walk at one year. He attributes lateness in walking to the de-

ficiency in the power of mental guidance, although in some cases physical weakness may be a cause. He says:

"If imbecile children are slow at learning to walk, they are still slower at learning to speak. The lower classes of idiots never learn to speak at all. Of 103 cases of which I have notes, 36 were found mute on entry, and 67 could speak more or less. The average time at which they began to speak was four years and three months. (4¼ years.) Only four were noted as having begun to speak at one year. Sometimes they began to speak as late as ten or twelve . . . they had no ideas to express."

Tredgold (22) has made similar observations. He says (p. 90):

"A similar retardation of physiological activity is seen with regard to dentition, speech, and walking. Inquiries show that a large proportion of aments do not cut their first or second teeth until some considerable time after the ordinary period. Many of them do not attempt to stand until their third year, and walking is correspondingly late. In many cases the child is four or five years old before it says a word."

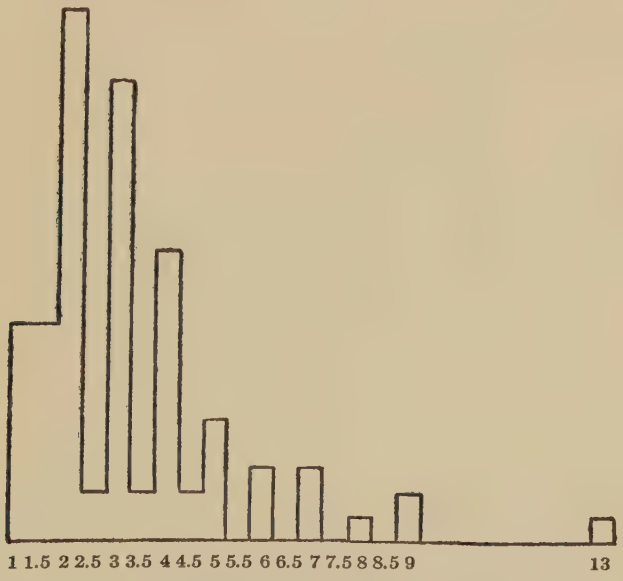

FIG. 8. Surface of frequency (half-years) Talking
92 Feeble-Minded Boys and Girls

In table form, the above findings and observations would be, letting I represent normal children; II, "schoolable" feeble-minded children; III, "idiots":

	Number of Children	Age at Walking (Months)	Age at Talking (Months)
I	50	13.54	15.8
II	144—walking 92—talking	21.6	34.4
III	111—walking 67—talking	30.0	51.0

Of the many articles in print on the development of speech in the child, the following from Preyer (13), p. 106, is perhaps as good a summary as may anywhere be found:

Fig. 9. Figure 8 "Smoothed"—half years thrown, half and half, to the year
92 Feeble-Minded Boys and Girls—Talking

"The first thing with which the learning of speech begins is not, as was formerly assumed, the first cry of the newly born,

for this can have no other significance than that of a reflex, like sneezing for instance. In fact, it often occurs that children announce their entrance into the world by a sneeze instead of a cry. But when strong impressions of various kinds have alternated with one another—when feelings such as hunger, pain, cold, on the one hand, and satiety, pleasure, warmth, on the other, have been discriminated, then crying acquires a speech significance, and the mood of the child may be perceived through the variations in his voice. . . . But all loud utterances of this sort that express bodily, and very soon also, mental states, are the farthest possible from being portions of an articulate language; rather are they completely analogous to the language of animals. Nor have those syllables the least claim to significance as language which are heard sometimes as early as the seventh or eighth week, . . . as ba, ma, am, ab, gö (etc.). These are produced, just as are the later sounds, . . . in the babbling monologues of the infant, by the movements of the vocal muscles, often through pure accident; and they have at the beginning no more psychogenetic significance than snoring, ...

"These utterances even in the third quarter of the first year are still almost wholly devoid of significance as language; but in the fourth quarter the character of them very often changes, and we may perceive that sounds uttered are influenced by the sounds heard from other persons, by words. With this is reached the critical point in the learning of language. That point is passed on the day when the child for the first time uses a word of verbal language independently and correctly."

That sensory impressions are prerequisite to audible expression there seems to be no question. That "ideas," translated into intelligent forms of expression, form the basis of speech in man there can be no dispute. That such ideas come slowly to the mentally deficient child we must admit. That speech is slow in such children, as a group, must be evident from the above findings. The individual exception may appear, but the fact seems apparent that, while in the individual physical weakness or adenoid growth, or other malformation,[1] may be contributory

[1] On the importance and effects of structural irregularities in the peripheral organs of speech, with clinical cases given, see references 6, 7, 8, 9. The substance is, that mental retardation may be the result, as well as the cause,

causes to lateness in walking or talking, the general tendency of the deferred ripening of the walking and talking instincts, as shown in large groups of children, may well be a matter of grave concern. By the slow, and more seriously, the impaired, maturing of these instincts, stimuli of greatest educational value in the earlier months are withheld from the child. If general psychic activity be sluggish, proper functioning does not occur, and conscious associations are not so readily formed as in the healthy normal child. If the child has a motor or sensory defect, his inability to "break up" sensations leaves him the longer in mental darkness.

That the ability of the child to form ideas is the vital thing in learning to talk, we would see from Preyer (13) p. 89—"ideas are the necessary previous condition for the understanding of the first words learned, and therefore for learning to talk. If these ideas are wanting, the development of languages is not attained." This qualification however follows, p. 94—"no special activity of intellect is proved by the quick learning of speech. . . . On the contrary, excessive speaking argues less intelligence, because, of course, less time remains for thinking." Tracy (21), p. 131, would offer a similar observation. He says: "The wide differences among children make it unsafe to venture any generalizations, except one: viz., this second half year seems to be par excellence the period of the rise of imitation. Some children, however, are as far advanced at the beginning of this period as others are at its end. Perhaps it ought also to be remarked that the child who shows a great precocity in imitation, or in learning to speak, will not necessarily on that account turn out a more intelligent child. Imitation does not require a very high degree of mental acuteness, and the child who has been slow in this may in the end surpass his more precocious companion."

While too much importance should not be attached to individual cases, and while normal children in themselves vary greatly in the time of learning to speak, the accomplishment of groups of children of differing degrees of intelligence is not a

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of defective or late speech. "Backwardness in children is not always due to a central lesion, but may be the result of arrested cerebral development due to some abnormality of structure in peripheral organs." (7) "Retarded development of speech always results in defective mentality." (8)

matter that can be lightly set aside. Man at present is more intelligent than primal man. He learns to utter the first intelligent word sooner than did his ancestors. Phylogeny was slow in speaking. Romanes in his "Mental Evolution in Man" (16), ch. 16, says: "Lastly, if we take the growing child as an index of psychogenesis in the race, there can be no doubt that it points to a comparatively late origin of the faculty of articulation. . . . For even a precocious child does not begin to make any considerable use of words as signs until it is well on into its second year, while usually this stage is not reached until the third." Four years in fact, we might infer from Romanes, is an age corresponding better to the phylogenetic acquisition of language. Does the feeble-minded child then more truly represent phylogeny, in the faculty of speech, than the healthy, normal child?

As a final summary of the "Age of Walking and Talking in Relation to General Intelligence," the following is submitted as the findings of this study:

I

Data

Fifty "normal" children (25 boys and 25 girls), averaging less than six years of age, of graduate students of Teachers College and Columbia College. Ages were thrown to the nearest month.

Walking means: "To take a step unassisted."

Taking means: "To use a word intelligently, i.e., to associate the idea with the object."

Results

The median "normal" child begins to walk at 13.54 months, with a probable error of 1.06 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than .72 months—stated in another way, the chances are 999 out of 1,000 that the true median lies between 12.82 and 14.26 months; and 10 to 1 that it lies between 13.16 and 13.92 months. The extreme range is from 11 to 30 months. Ninety per cent of the cases fall between 11 and 17 months.

The median "normal" child begins to talk at 15.8 months, with a probable error of 2.83 months. The chances are 999 to 1

that the true median will not differ from the median obtained by more than 1.92 months—stated in another way, the chances are 999 out of 1,000 that the true median lies between 13.88 and 17.72 months; and 10 to 1 that it lies between 14.8 and 16.8 months. The extreme range is from 9 to 25 months. Ninety per cent of the cases fall between 10 and 21 months, with 18 months as the mode.

II

Data

One hundred and forty-four "schoolable" children (boys and girls) of the Indiana School for Feeble-Minded Youth, in reply to the question on the personal descriptive entrance blanks: "At what age did the child commence to walk?" and 92 children in reply to the question: "At what age did the child commence to talk?"

Results

The median feeble-minded child begins to walk at 21.6 months, with a probable error of 7.56 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than 3 months—stated in another way, the chances are 999 out of 1,000 that the true median lies between 18.6 and 24.6 months; and 10 to 1 that it lies between 20.03 and 23.18 months. The extreme range is from 12 to 72 months. Ninety per cent of the cases fall between 13 and 50 months.

The median feeble-minded child begins to talk at 34.44 months, with a probable error of 12.84 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than 6.43 months—stated in another way, the chances are 999 out of 1,000 that the true median lies between 28.01 and 40.87 months; and 10 to 1 that it lies between 31.09 and 37.79 months. The extreme range is from 12 to 156 months (only one case going above 108 months). Ninety per cent of the cases fall between 14 and 84 months.

Children in general learn to walk before they learn to talk.

Boys, whether normal or feeble-minded, learn to walk and talk later than girls.

In decided cases of imbecility, children walk and talk later than in the less pronounced grade of mental defect.

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CHAPTER III

HEIGHT AND WEIGHT OF CHILDREN IN RELATION TO GENERAL INTELLIGENCE

Mental dullness or brightness and general body growth have in the past been associated in various studies by investigators. That on the whole, in groups of children, there seems to be some correlation is evident. In a study on St. Louis children Porter (9) concluded that bright children are taller than dull children, and that "precocious children are heavier and dull children lighter than the mean child of the same age." Smedley (11) and MacDonald (6) have in substance made similar conclusions.[1]

Problem and Data

If such relation were evident among normal children, would the differing degrees of mentality as exist in children mentally defective be reflected, on the average, in the height and weight of these children? Would we find also a greater variability among such children? With such questions in mind two hundred eighty-eight boys and one hundred forty-one girls of the Indiana School for Feeble-Minded Youth were examined in February and March, 1910. Among other tests physical and mental, the strength of grip and dextrality were also taken. This will furnish the data for a study now in preparation.

In order to have norms with which to compare normal children and the mentally defective, two hundred thirty-six boys and two hundred forty-five girls of the Caldwell, New Jersey, public schools were measured in May, 1912,[2] as to the same traits by the same examiner and as nearly as possible under the same conditions. The height was recorded with shoes in both groups;

[1] For a condensed summary of several investigations, see Whipple (14) pp. 47–60. West (13) reaches an opposite conclusion. His classification of children was on the teacher's judgment, while Porter's was the school grade in comparison with age.

[2] For the use of the schools, the author is indebted to Superintendent D. C. Barnett and the Board of Education.

the weight, with ordinary clothing. All measurements and all calculations have been made by the author himself. The factor of variability has been reduced to the minimum. The ages are given in years and months. In reckoning the age from birth, from one to fifteen days inclusive were dropped, and from sixteen to thirty were added to the month.

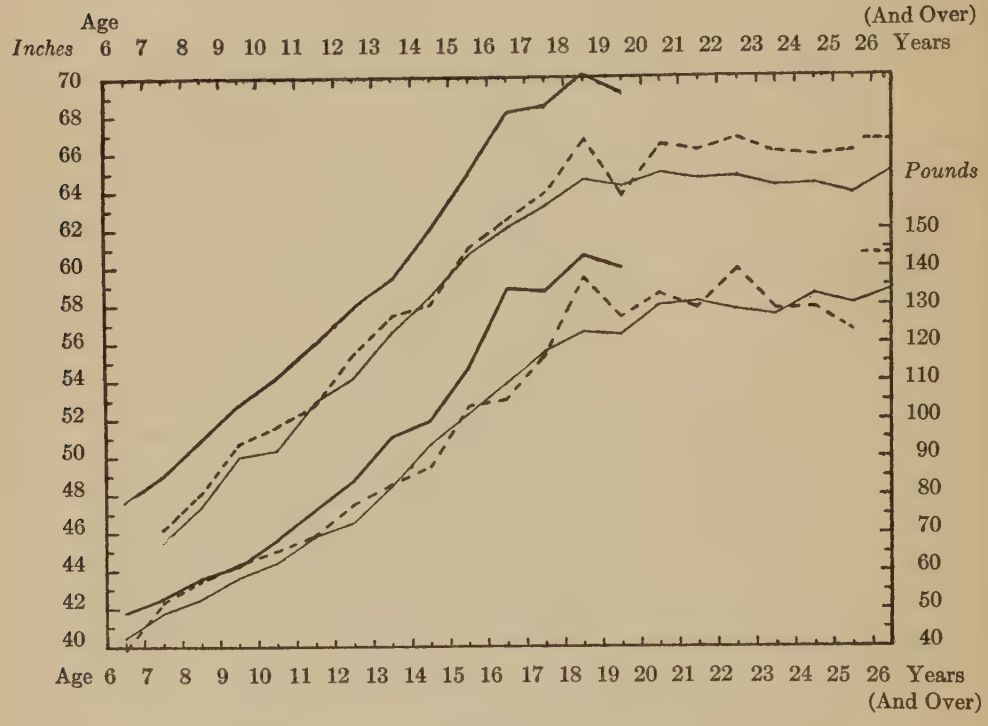

FIG. 10

Height—Inches—Caldwell School Boys (236)
" — " —F. M. Boys (280)
" — " —Goddard's 4500 F. M. Boys—without shoes

Weight—Pounds—Caldwell School Boys (236)
" " F. M. Boys (284)
" " Goddard's 4500 F. M. Boys

The defective children were classed from the experience and association of the teacher, attendant, and principal, into A, B, C, D, E grades. These would group approximately into the

common institution classes of morons (A-B); imbeciles (C); idiots (D-E).[3] On account of the few cases, the tables and charts which follow show two grades of intelligence, the morons in one group, and the imbeciles and idiots in the other, in comparison to the normal group. The group of total defectives also is given. The individual measurements of each child are grouped according to sex, age,[4] grade, and number of cases, with averages and deviations,[5] in Tables IX-XII. The curves representing these data show in Figs. 10-14.

TABLE IX

BOYS' HEIGHT—INCHES (WITH SHOES)

Age	Grades A and B Moron		Grades C, D, and E Imbecile and Idiot		Total Defectives			Normal		
	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A.D.
6			1	40.80	1	40.80		8	47.57	1.9
7	5	45.76	3	46.83	8	46.16	2.4	14	49.01	1.5
8	10	48.49	4	47.12	14	48.10	1.4	32	50.94	1.9
9	10	51.61	4	48.65	14	50.76	2.1	29	52.67	2.3
10	11	52.46	7	50.47	18	51.68	1.6	18	54.16	2.2
11	13	53.89	9	51.20	22	52.79	2.4	19	55.99	2.4
12	10	56.51	8	54.36	18	55.55	3.1	24	57.92	2.2
13	11	58.18	6	56.28	17	57.51	3.4	14	59.37	2.8
14	14	60.04	11	55.43	25	58.01	4.2	25	62.06	3.0
15	15	63.01	8	57.50	23	61.09	4.5	26	64.99	3.0
16	8	65.75	9	59.52	17	62.45	3.8	17	68.17	1.7
17	4	65.77	6	62.68	10	63.92	4.2	6	68.53	2.0
18	5	67.00	2	66.20	7	66.77	1.7	3	70.20	1.1
19	3	67.07	6	62.05	9	63.72	3.6	1	69.30	
20	3	67.97	6	65.83	9	66.54	1.5			
21	1		7		8	66.21	1.4			
22	0		5		5	66.80	2.6			
23	4		10		14	66.04	1.8			
24	0		2		2	65.85	3.5			
25	1		4		5	66.12	2.0			
26-48	9		25		34	66.69	2.2			
	137		143		280			236		

[3] The moron has a mentality comparable to that of the normal child of from eight to twelve years; the imbecile, three to seven years; the idiot, two years or under. See Goddard (5) p. 221.

[4] Six years of age means from six to seven.

[5] In calculating the average deviation, decimals from one to six tenths were dropped, and those above added.

Interpretation of Graphs

In all the graphs the age appears at the bottom and also at the top. On the average, the age will fall near the half year.

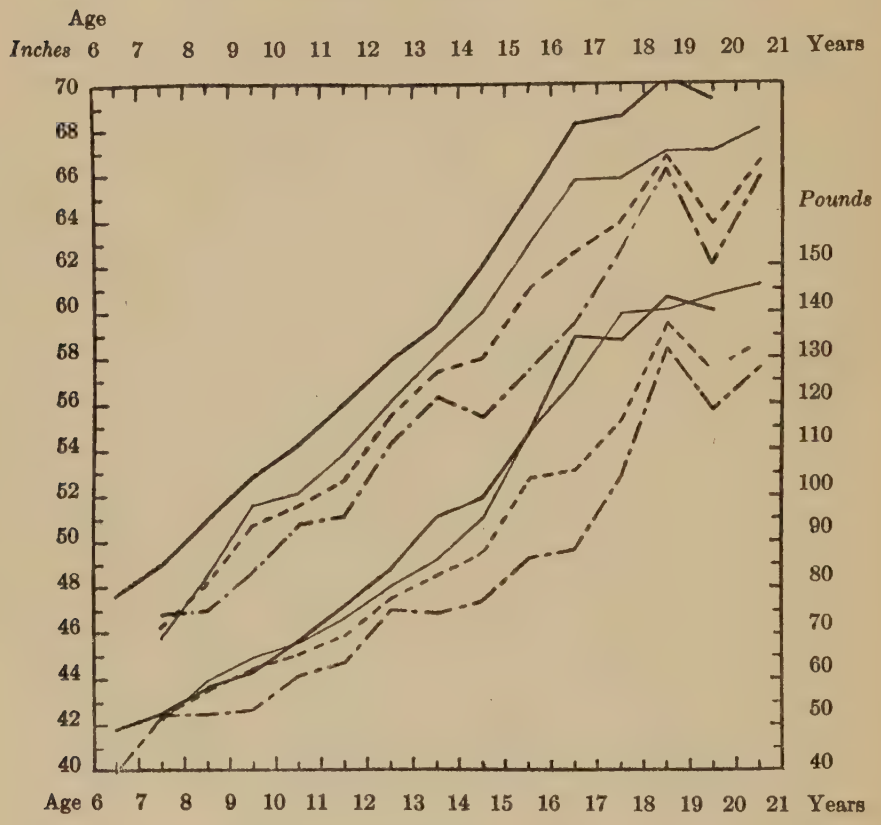

Fig. 11

Height—Inches—Caldwell School Boys (236)
" " F. M. Moron Boys (122)
" " All Grades F. M. Boys (211)
" " F. M. Imbecile and Idiot Boys (89)

Weight—Pounds—Caldwell School Boys (236)
" " F. M. Moron Boys (120)
" " All Grades F. M. Boys (216)
" " F. M. Imbecile and Idiot Boys (96)

The scale of inches is marked on the left margin; the scale of pounds, on the right. The upper group of curves represent

height, the lower group weight. The accomplishment in either trait is read from the same age point.

It should be noted that in the group of Caldwell school children a relatively high grade of children has probably been chosen. It is a little city of some five or six thousand, about an hour from New York City, and is a most healthful place with the advantages of country life.

TABLE X

BOYS' WEIGHT—POUNDS (ORDINARY CLOTHING)

Age	Grades A and B Moron		Grades C, D, and E Imbecile and Idiot		Total Defectives			Normal		
	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A.D.
6			1	39.00	1	39.00		8	49.12	6.5
7	5	51.80	3	52.33	8	52.00	6.0	14	52.82	4.6
8	10	59.60	3	52.33	13	57.92	4.0	32	58.04	5.2
9	10	64.90	4	53.75	14	61.71	7.3	29	61.39	8.0
10	11	68.27	10	60.70	21	64.66	5.8	18	68.51	8.7
11	13	73.30	9	63.88	22	69.45	7.4	19	76.31	12.2
12	10	80.30	9	75.11	19	77.84	12.0	24	84.03	12.7
13	11	86.00	5	74.80	16	82.50	12.1	14	95.53	18.2
14	14	95.21	12	77.16	26	86.88	19.6	25	99.57	14.8
15	14	113.85	8	86.25	22	103.82	19.9	26	113.63	16.7
16	8	125.25	10	88.20	18	104.66	22.1	17	134.52	12.4
17	4	139.75	7	104.14	11	117.09	26.3	6	133.83	11.5
18	4	140.25	2	132.00	6	137.50	8.8	3	143.16	10.5
19	3	143.66	6	118.66	9	127.00	29.8	1	140.00	
20	3	146.00	7	127.86	10	133.30	17.3			
21	1		7		8	129.50	7.2			
22	0		5		5	139.40	18.4			
23	4		10		14	129.07	13.6			
24	0		2		2	129.50	13.5			
25	1		4		5	123.80	19.8			
26-48	9		25		34	143.80	18.4			
	135		149		284			236		

From Fig. 10 we see the Caldwell boys higher at each age by from two to five inches than feeble-minded boys, the difference increasing somewhat gradually with age. All cases of feeble-minded over twenty-six years were grouped and the average height and weight both appear at the right margin, the average height of adult feeble-minded over twenty-six years being about

66.7 inches. The light continuous line of the upper group shows the average height of about 4,500 feeble-minded boys, six to twenty-six years of age, without shoes, as compiled by Goddard (5)[6] in 1912. Allowing an inch for shoes, the general similarity of the two curves is evident.

The curves for weight are not as smooth as might be wished; a greater number of cases would of course tend to make them more regular. For ages seven to nine the two curves approximate, feeble-minded boys at nine years showing a little heavier than normal boys. After age ten normal boys are consistently heavier than defectives by from five to fifteen pounds, the difference increasing in a general way with age.[7] The adult weight for thirty-four boys over twenty-six shows 143.8 pounds. The sedentary institution life and more regular dieting and sleep tend toward weight, especially in the more imbecile cases. The same might be said of all grades in the earlier years. Goddard's curve for weight for about 4,500 feeble-minded boys, six to twenty-six years of age, is shown in the lower light continuous line.

FIG. 11 shows again the curves of height and weight for normal and defective boys as separate groups and in addition, the defectives divided into two groups, the higher grade moron, and the lower grade imbecile and idiot. The heavy line in either group is the normal; the light line, the higher grade defectives; the broken dash line, all defective boys of this study; the broken dot and dash line represents the lower grade imbecile and idiot as a group. This graph shows the imbecile and idiot boy lower in stature and less in weight than the group of feeble-minded boys in general, excepting age seven. It shows the higher grade moron taller and heavier at each age, excepting seven, than the defective group whole. In weight the moron group more nearly approximates and at places exceeds the normal. At no age

[6] This work is by far the greatest ever done and sets norms for years to come for the feeble-minded in height and weight.

[7] Tarbell (12) says: "Feeble-minded children (boys and girls) are about two inches shorter and nine pounds lighter than normal children of the same age."

Goddard (5) p. 229 says: "If, however, we take the line representing defectives of all grades, we find that while 'he is not two inches shorter and nine pounds lighter' he nevertheless is one inch shorter and two pounds lighter up to the age of fifteen. After that he is three inches shorter and twelve pounds lighter."

in height, and at no age in weight excepting 8, 9, 17 and 19 years, does the high grade mentally defective boy reach or exceed the average normal boy of six to nineteen years in these traits.[8] These exceptions may very probably be due to the few or exceptional cases, and the author wishes it clearly understood that

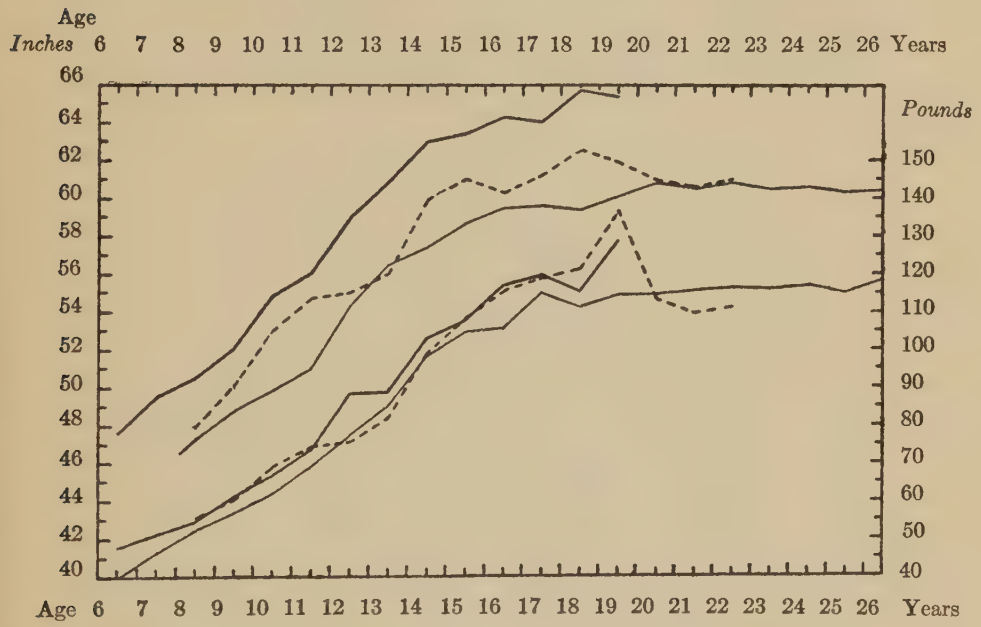

FIG. 12

———Height—Inches—Caldwell School Girls (245)
- - - - - " " F. M. Girls (139)
_____ " " Goddard's 3300 F. M. Girls—without shoes

———Weight—Pounds—Caldwell School Girls (245)
- - - - - " " F. M. Girls (138)
_____ " " Goddard's 3000 F. M. Girls

conclusions other than the most general based upon these data are not wise.

The record of girls is pictured in Fig. 12. The curves for height are more irregular than those of the boys. From this

[8] A greater number of cases would probably "smooth out" the exceptions at the two latter ages.

study mentally defective girls as a group are on the average from two to five inches shorter than normal school girls. This is about the same as with boys. It will be noted that there is a larger difference between the defective girls of this study and Goddard's 3,300 institution girls in regard to height than difference between boys (Fig. 10). In this study the two groups of higher and lower grades are about the same in number with boys, but with girls there are nearly twice the number of the higher grade.

TABLE XI

GIRLS' HEIGHT—INCHES (WITH SHOES)

Age	Grades A and B Moron		Grades C, D, and E Imbecile and Idiot		Total Defectives			Normal		
	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A. D.
6								9	47.60	1.4
7								17	49.53	2.3
8	1	49.00	4	47.55	5	47.84	3.4	17	50.49	2.8
9	3	50.80	5	49.70	8	50.11	2.4	27	52.00	2.1
10	2	50.60	6	54.00	8	53.15	2.0	22	54.84	2.1
11	6	54.45	1	56.50	7	54.74	1.3	23	56.05	3.0
12	7	54.78	5	55.24	12	54.97	2.8	19	59.03	2.1
13	2	53.00	7	56.84	9	55.99	3.0	27	60.84	1.9
14	13	60.28	4	58.52	17	59.87	2.3	20	63.02	3.0
15	7	61.15	2	60.75	9	61.06	3.7	28	63.43	2.1
16	11	61.06	3	57.36	14	60.33	2.5	20	64.34	2.0
17	12	61.58	2	59.00	14	61.21	2.0	10	64.05	1.8
18	6	62.91	5	62.18	11	62.58	2.2	4	65.70	.5
19	5	61.94	1	62.10	6	61.96	1.8	2	65.40	3.1
20	10	62.52	3	56.17	13	61.05	3.0			
21	3	60.30	1	61.60	4	60.62	3.0			
22	2	60.95	0		2	60.95	2.3			
	90		49		139			245		

In weight it is very noticeable that the girls of the two large groups, normal and defective, up to nineteen years deviate less than do the boys. Weight would no doubt be subject to modification by regular habits of eating and sleeping much more than the individual's natural tendency to stature. These girls of institution care show the good effects of such regularity when it comes to bodily weight.

Fig. 13 shows the defective girls divided into the higher and lower grades of mental defect. These curves are very unsatisfactory, showing much irregularity. This condition may be due to one or several causes. First, the classing of the defective

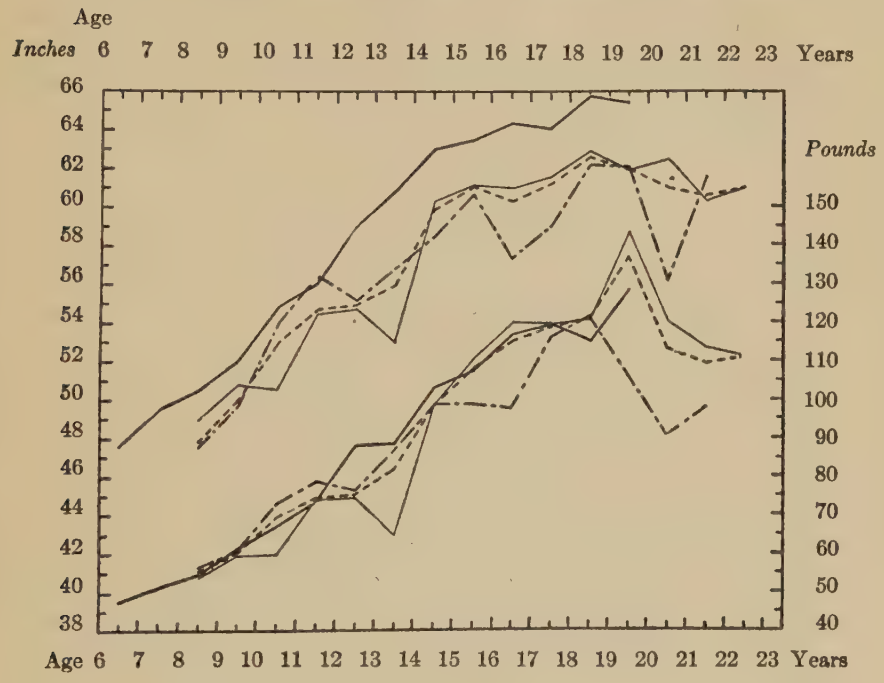

Fig. 13

——— Height—Inches—Caldwell School Girls (245)
——— " " F. M. Moron Girls (90)
- - - - - " " All Grades F. M. Girls (139)
— — — " " F. M. Imbecile and Idiot Girls (49)

——— Weight—Pounds—Caldwell School Girls (245)
——— " " F. M. Moron Girls (90)
- - - - - " " All Grades F. M. Girls (138)
— — — " " F. M. Imbecile and Idiot Girls (48)

children into grades is chiefly empirical, an interchanging of one or two cases might modify the lines; second, it is to be regretted that the number of girls tested is much smaller than that of boys; third, there may be exceptional cases as number 123 at age 20 (Table X). The most peculiar feature of the lines as they are

is the crossing at age fourteen. From Fig. 11, high and low grade defective boys are distinctly apart at each age in height and weight. But with girls the curves cross at 14. Before this time (excepting 8 and 9 years in height) the lower grade girls are taller and heavier than the brighter girls; after age 14, the reverse is true. Can it be that high and low grade defective girls at about the fourteenth year reverse themselves in body growth? Again let it be understood that the condition is probably due to too few or exceptional cases.

TABLE XII

GIRLS' WEIGHT—POUNDS (ORDINARY CLOTHING)

Age	Grades A and B Moron		Grades C, D, and E Imbecile and Idiot		Total Defectives			Normal		
	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A. D.
6								9	47.94	5.5
7								17	51.29	6.1
8	1	52.00	4	56.75	5	55.80	9.0	17	54.38	6.5
9	3	59.66	5	61.00	8	60.50	7.2	27	61.48	6.9
10	2	60.00	5	73.20	7	69.43	6.7	22	67.14	7.4
11	6	74.00	1	79.00	7	74.71	10.8	23	73.88	13.2
12	7	74.71	6	76.83	13	75.69	8.9	19	88.41	12.7
13	2	65.00	6	87.66	8	82.00	13.7	27	88.44	9.4
14	13	99.00	4	99.00	17	99.00	13.0	20	103.13	12 3
15	7	110.71	2	99.00	9	108.11	17.0	28	107.87	11.2
16	11	120.09	3	98.00	14	115.35	17.6	20	117.00	11.5
17	12	119.50	2	116.50	14	119.07	12.6	10	119.67	10.8
18	6	121.18	5	121.80	11	121.45	12.8	4	115.27	8.8
19	5	143.20	1	106.00	6	137.00	24.0	2	128.65	8.2
20	10	120.00	3	90.66	13	113.23	18.5			
21	3	113.66	1	98.00	4	109.75	11.2			
22	2	111.00	0		2	111.00	3.0			
	90		48		138			245		

SEX DIFFERENCES

Various studies with large groups of normal children have shown that from about eleven to fifteen years of age the girls were larger than boys in both height and weight. For example, Smedley (11, p. 1100); or MacDonald (6, p. 1023.)

In order to see whether or not this condition reflected itself in measurements of mentally defective children, Fig. 14 was made

to show the records of both groups in both traits superimposed. The heavy and light continuous lines in the upper group represent the height of the Caldwell school boys and girls respectively.

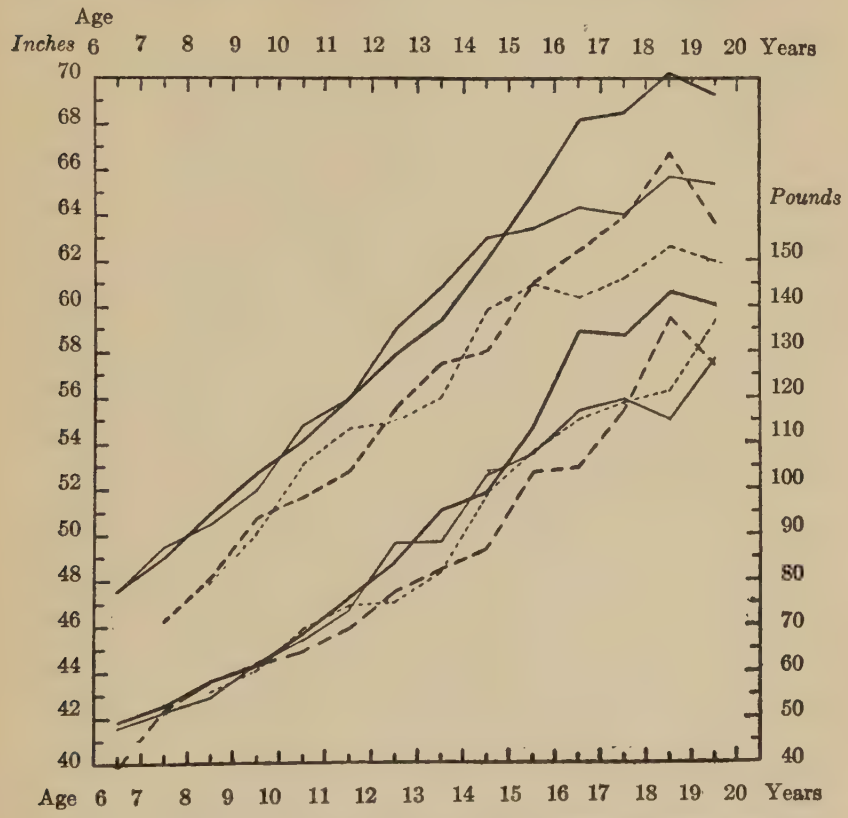

FIG. 14. COMPARISON OF SEXES—NORMAL AND FEEBLE-MINDED—HEIGHT AND WEIGHT

———— Height—Inches—Caldwell School Boys (236)
———— " " Caldwell School Girls (245)
— — — " " F. M. Boys (211)
..... " " F. M. Girls (139)

———— Weight—Pounds—Caldwell School Boys (236)
———— " " Caldwell School Girls (245)
— — — " " F. M. Boys (216)
..... " " F. M. Girls (138)

The broken dash and broken dot lines represent the height of feeble-minded boys and girls. The same comparisons are true in the lower group of lines as to weight. Excepting ages twelve and thirteen with defectives, in which there is an abnormal rise with boys and drop with girls, normal and feeble-minded girls are taller than normal and feeble-minded boys from ages ten to fifteen. In weight there is the same general condition. Excepting age thirteen with normals at which both curves are irregular, the Caldwell girls weigh more than the Caldwell boys from about

TABLE XIII

PER CENT OF DEFECTIVES REACHING OR EXCEEDING AVERAGE CALDWELL NORMAL CHILDREN

	Boys' Height			Boys' Weight			Girls' Height			Girls' Weight		
Age	Cases	No.	Per cent.	Cases	No.	Per cent.	Cases	No.	Per cent.	Cases	No.	Per cent.
6	1	0	0.0	1	0	0.0						
7	8	1	12.5	8	5	62.5						
8	14	1	7.1	13	5	38.5	5	2	40	5	2	40
9	14	5	35.7	14	7	50.0	8	3	37.5	8	4	50
10	18	2	11.1	21	6	28.6	8	3	37.5	7	3	42.9
11	22	3	13.6	22	4	18.2	7	2	28.6	7	4	57.1
12	18	5	27.8	19	7	36.8	12	1	8.3	13	3	23.1
13	17	7	41.2	16	3	18.7	9	1	11.1	8	3	37.5
14	25	6	24	26	7	26.9	17	3	17.6	17	6	35.3
15	23	7	30.4	22	6	27.3	9	3	33.3	9	4	44.4
16	17	3	17.6	18	2	11.1	14	2	14.3	14	4	28.6
17	10	1	10.0	11	5	45.4	14	3	21.4	14	5	35.7
18	7	0	0.0	6	1	16.6	11	2	18.2	11	7	63.6
19	9	1	11.1	9	3	33.3	6	0	0.0	6	4	66.6
Total	203	42	20.7	206	61	29.6	120	25	20.8	119	49	41.2

beginning twelve to beginning fifteen years. Noting exceptions at the twelfth and thirteenth years in the lines for defectives, feeble-minded girls are heavier than feeble-minded boys from ten to seventeen years. Sex differences as to height and weight in normal children through adolescence is approximately the same with mental defectives.

VARIABILITY

As far as is known to the author only one other study has calculated the age variability in height and weight of mentally

defective children. Wylie (16) in a study of about four hundred children of each sex, from one to thirty years of age, found the mean variation to be greater with defectives than with normals.[9] Referring to Tables IX to XII, one can compare the variability at age of the two classes of children in this study. Excepting ages 8, 9 and 10, defective boys are more variable than normal boys in height. In weight, up to about age thirteen, defective boys are more constant; after thirteen they are more variable than normal boys.

From eight to nineteen inclusive, defective girls vary more than normal girls in height if we except ages 10, 11, 14, and 19. In weight, after the thirteenth year, defective girls vary more than normal girls at age. Very probably a greater number of cases, if distributed over the grades of defect, would show defective children more variable in height and weight than normal children, excepting possibly weight in the earlier years, if defective children had the regular care of institution life.

Per Cent of Defectives Reaching or Exceeding Average Caldwell Normal

This is shown in Table XIII for each age. To interpret, take age seven for example: Of eight mentally defective boys, one or 12.5 per cent reached or exceeded the average height of Caldwell boys at the same age. Or taking the total: of 203 mentally defective boys from six to nineteen years of age inclusive, forty-two or 20.7 per cent reached or exceeded in height the average Caldwell boy at age. This is significant and means approximately that only one defective boy or girl in five reaches the average height for his age of a normal boy or girl. In weight boys make nearly a thirty per cent showing, while girls almost reach the average. Norsworthy (7) found these per cents to be considerably higher. She very probably had, on the whole, a higher grade of defective children.

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[9] He says, p. 6: "For height the curve of mean variation exceeds that of normal children except in two or three instances. In general the mean variation is greatest at times of fastest growth, but there are many marked exceptions to the rule. . . . The curve of mean variation for weight shows the same general features as that of height except that it is nearer normal up to ten years."

Conclusion

It seems a safe conclusion from the above data that not only is mental defect reflected on the average in the height and weight of children, but the more decided the defect the more checked the physical growth. (From Fig. 13 there may be an exception with girls before fourteen years.)

This is more evident in height than in weight, the first being probably less subject to modification by regular habits of sleep, diet, etc.

Feeble-minded girls more nearly approximate normal girls in weight than feeble-minded boys approximate normal boys.

The commonly known fact that girls are taller and heavier than boys during early adolescence shows itself also with mental defectives.

Defective boys and girls are more variable in height than normal boys and girls. Before thirteen years, defective boys and girls of institution life are more constant in weight than normal boys and girls.

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CHAPTER IV

STRENGTH OF GRIP AND DEXTRALITY IN RELATION TO GENERAL INTELLIGENCE

One of the peculiarities of the feeble-minded is his weak and listless hand grasp. In the gymnasium he fumbles at his piece of apparatus. He is not sure of his hands. As man has progressed in the scale of evolution, the hand as an instrument of the mind has gradually become more deft and skilled. In this organ he is infinitely beyond the animal. "It is perhaps not too much to say that the hand, through which alone (the) embodiment of thought and purpose is mediated is of all bodily members the most human and most noble; and that in its features and capabilities is symbolized all that man has achieved in his long upward march from the primeval ooze." (MacDougall (17), p. 242.)

As a means of mental acquisition, few of the bodily organs are more important than the ability of the hand to lay hold of and grasp things. If a child has not this power developed as it should be, the power to pick up and examine, hold fast to, take apart, and cast away, he is deprived of an avenue of acquisition second only to that of a sense avenue. If the characteristic above of the mentally deficient child is one noticeable in the daily work with him, will he in the registry of his strength of grip or his power of prehension give us an index of his mental caliber? How does he compare with his more fortunate brother and sister? Would the degree of his imbecility be reflected on the average in the reading of the dynamometer?

With these questions in view, 202 mentally defective boys from seven to twenty-five years of age and 129 mentally defective girls from eight to twenty-two years of age of the Indiana School for Feeble-Minded Youth were tested in March, 1910, with the dynamometer for strength of grip. About thirty "adult boys" (defectives) from twenty-five to thirty-five years of age were also tested, but (beyond a mere statement of the

results) these latter are not used as a basis of comparison. Tests were also made with thirty-three graduate students of Columbia University. In May, 1912, 232 boys and 227 girls of the Caldwell, New Jersey, public schools were tested in the same way as the defectives, using the same instrument. Notes were also made concerning "dextrality" or (as used in this study) the preference or superiority of one hand over the other.

Before giving the data collected, results of previous work will be summarized.

Previous Work on Strength of Grip and Intelligence

Probably the greatest number of children tested in one group for dynamometer strength was by Smedley (20), Director of the Chicago Child-Study Department in 1899-1901, whose report is included in the Report of the United States Commissioner of Education for 1902. His tests were mostly physical, such as height, weight, strength of grip, etc., but included memory and a few other mental traits. The children were largely of American parentage in comfortable circumstances; so they may be said to represent normal city children. The number of boys was 2788; of girls, 3471. The ages varied from four to twenty-one inclusive; there being about two hundred fifty boys and two hundred fifty girls at each age six to sixteen, the number at seventeen and eighteen running less. He devised an "adjustable stirrup" grip, as he found that the ordinary two spring dynamometer was difficult for smaller children and that different phalanges would be used by different-sized hands. Each pupil was given "several" trials and the best result was recorded. Averages rather than medians were used as norms. (For the Smedley norms, see Whipple, "Manual of Mental and Physical Tests," p. 76). Some of his results follow:

1. Boys surpass girls in strength at all ages; and during the early years of adolescence this differentiation of the sexes is most striking.

2. "In the absence of any term corresponding to ambidexterity, and meaning unequal ability in the use of the hands without indication of which hand is the superior, the term 'unidexterity' is suggested." Children on the average are unidextrous,[1] with the right hand superior at the time they enter school,

[1] Some investigators suggest a connection between development of speech and right-handedness. (Wooley, *Psy. Bull.*, 7: 1910.)

and unidexterity increases during the early years of adolescence. Plotting his norms we find a more marked difference in the hands as maturity approaches. A heightened difference at puberty is noticed.

3. The relation between strength of grip and standing in school is shown by a distribution of twelve-year-old pupils by grades, also by comparing the grip of those at and above grade with the grip of those below grade at each age. An example of the first is here given:

Twelve-year-old Pupils by Grades

Grade	Number of Pupils	Average Grip Kg. R. H.	Average Grip Kg. L. H.
2	4	16.75	16.50
3	19	20.03	18.55
4	84	20.22	18.85
5	134	21.06	19.64
6	143	21.40	20.12
7	95	22.31	20.41
8	18	23.31	21.07

This shows that the more advanced of the twelve-year-old pupils are more decidedly unidextrous than are the retarded pupils. His tables show that this association between decided unidexterity and intellectual power holds good throughout school life.

From Smedley's computations, twelve-year-old pupils of the higher grades are superior also in stature, weight, endurance, and vital capacity to those in the lower grades. He says: "This demonstration of the physical superiority of the more intelligent pupils does not necessarily imply that small or weak men are always less efficient mentally than are large men, but it does seem to show that one is likely to attain to his highest mental development only as he reaches the physical growth and development which nature has marked out for him."

4. On the whole, the brightest are more decidedly unidextrous than are the average pupils; the average pupils more unidextrous than are the dull pupils. The John Worthy boys are still more nearly ambidextrous than the dull pupils of the regular schools.

5. At every age from nine to seventeen, the John Worthy incorrigibles and truants are with either hand less strong than normal boys, and this discrepancy increases very decidedly with

age. Also John Worthy boys (incorrigibles) far exceed dull pupils of other schools in the average number of growth abnormalities and the number of motor defects.

6. "Training in ambidexterity is training contrary to a law of child life."

MacDonald (16) made an experimental study of 1074 children of the Washington city schools. His measurements are typical of Americans because few foreigners reside there, all the states of the union are represented, and the well-to-do and poorer classes are pretty equally divided. He used the "oval" dynamometer and employed the average as a measure of central tendency. A few of his results follow:

1. Bright boys are in general taller and heavier than dull boys. (Bright, average, or dull on teacher's classification).

2. As to children with abnormalities, defects of speech are much more frequent in boys than in girls.

3. "The dynamometer is to some extent a sociological instrument, in distinguishing those who do manual labor from those who do not, by the greater strength of hand in the former. . . There seems to be no relation between strength of hand and mental ability."

4. "Children of non-laboring classes show greater ability in their studies than children of the laboring classes." (As a higher percentage of dullness then would be found in the children of the laboring group, in the light of (3) this would tend to account for the indications in his results that dull children have as strong or stronger grip than the average or brighter group. See Whipple (26), p. 76, and MacDonald (17), p. 1004.)

White Boys

Class	Number of Cases	Average Age		Strength of Grasp—Kilos.			
		Yrs.	Mos.	R. Total	R. Aver.	L. Total	L. Aver.
Bright.....	237	12	4	4687	19.9	4331	18.3
Average...	142	12	1	2644	18.6	2501.5	17.7
Dull.....	137	13	1	3369.5	24.6	3161	23.1
Total.....	516						

MacDonald's group of "dull" boys average thirteen years, one month, a year older than the "average" group, and nine months older than the "bright" group. A decided rise at about the thirteenth year is noticeable in the grip of children in general. The "dull" group in short had a year's advantage in age.

Carman (3) tested 1507 children of Saginaw, Michigan, their ages being from ten to nineteen. She used the "Collin" dynamometer. Most of the children were of foreign parentage of the laboring classes. There were 756 boys and 751 girls. The nearest age was used. The average was taken as a measure of central tendency. Results:

1. In comparison to Smedley's table of norms, Miss Carman found with her group, which was principally foreign, that the average age grip was a little less with boys, more markedly less with girls.

AVERAGE STRENGTH OF GRIP IN KILOGRAMS

Boys	Right Hand	Left Hand
Bright	21	17
Dull	20	18
Girls		
Bright	16	13
Dull	13	12

Averages as to "brightness" and "dullness," based on ages 10 to 14 inclusive, number of pupils, 576 boys, 511 girls. Children reported "bright" or "dull" by teacher.

Age	Number of Boys	Number of Girls
10	96	86
11	104	102
12	123	132
13	152	107
14	101	84
Total	576	511

2. Boys reported by their teachers as "bright" were more sensitive than dull, were stronger in their right hand but weaker in their left hand than the dull, but in general were stronger.

3. Boys and girls with light hair and eyes are less sensitive to pain and less strong than boys and girls with dark hair and eyes.

4. Girls are weaker at all ages than boys.

5. Girls reported as "bright" were more sensitive and stronger in each hand than those reported as dull.

6. Of 756 boys, five per cent were left handed. Of 751 girls, 3.6 per cent were left handed. These data are based on the statements of the pupils.

Dawson (7) examined juvenile delinquents of the Lyman School for Boys at Westboro, Massachusetts, and the State Industrial School for Girls at Lancaster.

Some of the results with twenty-six boys, average age fifteen, and twenty-six girls, average age sixteen, follow:

1. The average height of the boys studied was inferior by 9.9 cms. to the average Boston boy at the same age; that of the girls was 6.1 cms. less.

2. The average weight of the boys examined was inferior to the normal average by 5.93 kilograms; the average of the girls examined was superior to the normal average by .55 kilograms.

3. In strength of grip, the delinquent boys were inferior to the normal standard by .27 kilograms; the girls, by .87 kilograms. 56 per cent of both sexes was inferior to the normal by from 1.32 to 11.82 kilograms while 44 per cent of both sexes was equal to the normal average, or superior by from 1.18 kilograms to 15.18 kilograms.

Schuyten (18) had at his disposition a large number of dynamometric tests in Holland. Estimating intelligence by school grade in relation to age his tables show:

1. "Ils demontrent que les intelligents, garçons et filles, sont les plus forts, à toutes les epoques de l'annee."

2. He also found that children of well-to-do parents were stronger than children of poor parents.

Cattell and Farrand (4) give the record of 99 students, average age eighteen, with none over twenty-three.

AVERAGE IN KILOGRAMS OF TWO TRIALS

Right hand	38.8	(85.54 pounds)
Left hand	34.6	(76.28 pounds)

This record is low because the average of the two trials was used instead of the best record. They advocate the maximum pressure of the thumb and forefinger.

Binet and Vaschide (2) measured the muscular strength of forty boys from twelve to thirteen years of age. They gave two trials alternately with each hand. The tests were given with

and without the stimulation of praise and encouragement. They found:

1. Dividing the forty children into four groups, the strongest to weakest, "les faibles sont plus souvent ambidextres que les forts, ou plutôt qu'ils ont deux mains gauches."

Group	R. H. Aver. Kg.	L. H. Aver. Kg.	Difference between Hands
1	27.25	22.15	5.1
2	22.25	19	3.25
3	18.5	16	2.5
4	15.75	14.25	1.5

2. The average grip was increased by about 3 Kg. where encouragement was given.

Wissler (27) states that "It has been claimed that strength of hand is a correlate of mental ability, that civilized men are stronger than uncivilized, and professional men than laborers. In these tests we find no correlation between class standing and strength of hand, r= −0.08." The number of cases was 204.

Claviere (5) sought to determine what influence, if any, intellectual effort has on muscular force as tested by the dynamometer. He concludes that:

1. In intellectual work intense and prolonged during two hours, there corresponds a notable and proportional diminution in the muscular force as measured by the dynamometer.

2. In intellectual work, in a moderate degree, there corresponds no appreciable weakening of the muscular force.

3. With no intellectual work there corresponds an augmentation of the muscular force.

In the Faribault, Minnesota, Training School, Dr. Wylie (30) in 1900 made hand-grasp tests on forty-four boys and forty-two girls. He used a Carroll dynamometer and Carman's findings on normal children for comparison. Only twenty-two of each group were used as having ages that could be compared to a measurement of normal children. Comparing each age with that of the normal children, and averaging the differences, he found:

	Right Hand	Left Hand
Boys	− 26.7 pounds	− 20.8 pounds
Girls	− 17.0 pounds	− 13.5 pounds

He says: "To such an extent do we find the grasp of our children subnormal." He found them to be about half as strong as normal children of the same age.

Grouping the children according to mental ability he found:

	Boys			Girls		
	Right	Left	Age[1]	Right	Left	Age[1]
A	61.4	56.4	17	39.9	36.5	20
B	60.7	53.5	22	36.7	34.4	22
C	48.3	47.3	20	33.6	32.7	20

[1] The age is the average for each group.

"This shows that the strength of grasp depends upon mental ability." We note also the association between unidexterity and mental ability as found by Smedley in his distribution of twelve-year-old pupils by grades.

Method of Administering the Tests at the Indiana School

A two-spring Narragansett Machine Company dynamometer was used in testing the grip of the children at the Indiana School for Feeble-Minded. They were tested during their gymnasium period. They were seated and called up one at a time. If their hands were moist with perspiration they dried them. They were encouraged to "squeeze their very best" and the result was always mentioned in a laudatory way. In fact they vied with one another to make the best score, some of the boys rolling up their sleeves. The dynamometer was placed uniformly in their hands, that is, in the same manner each time, but the pupil was told to "make it fit" or "feel right" before gripping. He was not allowed to lean upon anything or touch his other hand or arm to his body, but could use his arm freely. Characteristic grimaces and poses were of course evident. The instrument was lifted carefully from each hand and read silently by the author. The physical director made her reading and the results compared and entered immediately. Most of the tests were on two separate days, but if on the same day several minutes elapsed before the second effort so there would be no fatigue effect. The best score for each hand from two tests is used for the comparison.

These scores for each child may be seen in Chapter VI. The normal children of the Caldwell public schools were tested by the author with the same instrument under as nearly similar conditions as possible. The individual records of these latter children may be seen in Chapter VI. The accomplishments of these two groups of boys and girls are condensed in Table XIV. This table is pictured in Figs. 15, 16, and 17.

TABLE XIV

AVERAGES AND DEVIATIONS, RIGHT AND LEFT HAND GRIP, BOYS AND GIRLS NORMAL AND FEEBLE-MINDED AT AGE

Normal Children (Caldwell)

	Boys					Girls				
	Right			Left		Right			Left	
Age	No.	Average	A.D.	Average	A.D.	No.	Average	A.D.	Average	A.D.
6	8	19	5	18.4	5.6	9	16.8	6	13.6	3.7
7	14	22.8	6.1	21.9	4.7	17	17.6	5.4	17	5
8	32	28.8	6.3	27.3	6.4	17	21.4	5.7	22.6	5.6
9	29	34.4	7	30.7	7	27	26.5	6	24.8	5.5
10	17	39.7	9	36.3	7.8	22	31	6.3	30.8	7
11	19	46.4	10.5	42.8	10.3	23	38	11.2	35.8	7.8
12	24	53.9	12.5	49.9	10.9	19	50.3	12.7	47.9	10.4
13	14	58.1	13	56	14	27	53.4	8	48.3	8.3
14	25	69.5	11	64.1	12.5	20	65	10.7	60.3	11.4
15	24	88.3	21	79.8	18.3	25	70.2	9.7	65.8	10.6
16	16	110.8	14	99.9	9.3	17	73.4	7.8	67.2	7.1
17	6	116.8	9.8	101.3	7.7	2	70.5	7.5	63.5	9.5
18	3	116	8.7	104	6	2	73	1	75	7
19	1	133		125						
Total	232					227				

For purposes of charting and comparison the defective children were grouped into various grades of general intelligence previous to any measurements being made. This classification into A, B, C, D, and E grades was on the experience of the principal, teachers, and attendants who had been associated with these children for years. The A and B grades would approximate the "bright" schoolable mentally defective child, sometimes called "moron," while the C grade would class under the general institution case of "imbecile," the better ones of whom were in the institution schools. The D and E grades constituted the

common "idiot."[1] In the graphs, two groups of the mental defectives show, one group constituting the moron class, the other group including all grades of mental defect.

TABLE XIV—*Continued. Feeble-Minded Children*

	Boys					Girls				
	Right			Left		Right			Left	
Age	No.	Average	A. D.	Average	A. D.	No.	Average	A. D.	Average	A. D.
7	7	13.7	7.4	10.9	4.1					
8	12	17.8	8.6	15.8	6.8	2	16	1	15.5	1.5
9	11	27.6	9.4	25.9	7.4	6	16	2.6	15.2	3.4
10	12	32.3	8.5	33.1	5.3	7	25	8.	23.8	8.8
11	18	29.3	9.6	29.5	12	7	27.1	6.7	27.3	6.8
12	16	39.6	12.8	36.9	11.4	11	29.1	11.1	26	10.5
13	15	44.5	12.7	40.6	11.5	8	34	12.1	31.7	11
14	20	51.9	16.7	52.2	16.6	15	52.1	9	48.7	11.8
15	19	61.5	24.6	59.5	21	9	60.4	8.8	53.5	9.9
16	12	66.3	18.2	64.5	17.8	14	58.8	15.5	55.3	13.4
17	9	77	20.8	74.2	20.7	14	57.7	16.3	50.7	12.4
18	6	106.5	15.8	95.3	20	11	63.7	11.7	55.6	9.1
19	6	91.7	34.7	91.8	31.5	6	68.8	26.5	66.5	21.3
20	8	99	25	86.6	24.5	13	53.4	16.8	50.2	12.5
21	7	81.9	23.9	75.6	18.3	4	63	17.2	57	15
22	5	85.4	16.8	85.4	13.2	2	56	2	59.5	2.5
23	11	75.5	26.4	77.3	29					
24	2	87.5	7.5	79	7					
25	5	80.2	41	74	27.6					
26& over	32	80.2	29.5	82.6	26.6					
Total	233					129				

The lines for the Caldwell boys appear higher at each age, excepting seven, than the lines for Chicago school boys.[2] The former boys were without doubt a more select group as a whole. No mention is made by Smedley that praise or emulation entered as a factor in raising the individual record of the Chicago school boys. Binet (2) found this added three kilograms. The question of the instrument registering low, thus possibly putting the defective children at a disadvantage in comparison with the Chicago children, does not affect purposes of comparison; for the divergence is more marked between the Caldwell and defective groups, taken with the same instrument, than between the Chicago and defective children.

[1] For the mental classification of such grades of defect, see footnote on p. 31.

[2] The instrument used by me registered too low. The results for it when placed in a vise, a 32.5 pound weight being used were: Weight placed as "lightly" as possible on top: 28–28–28–28 pounds. Weight hung below in 13.5 ounce carriage: 24–23–25–25 pounds.

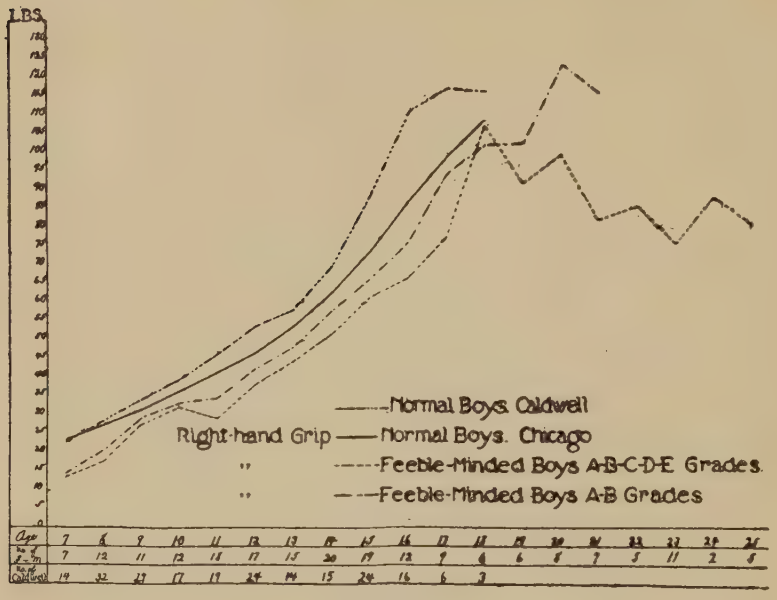
LBS.
Right-hand Grip
Normal Boys Caldwell
Normal Boys. Chicago
Feeble-Minded Boys A-B-C-D-E Grades.
Feeble-Minded Boys A-B Grades

FIG. 15

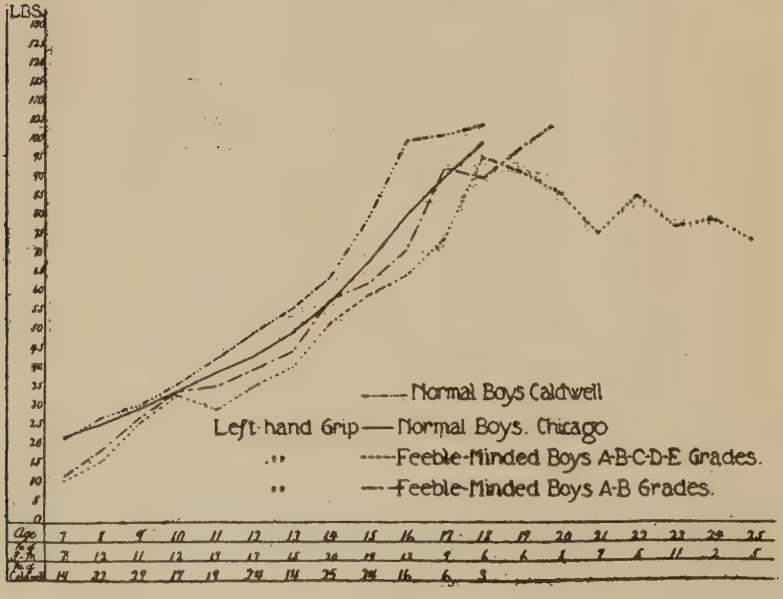
LBS.
Left-hand Grip
Normal Boys Caldwell
Normal Boys. Chicago
Feeble-Minded Boys A-B-C-D-E Grades.
Feeble-Minded Boys A-B Grades.

FIG. 16

Interpretation of Charts

Figs. 15 and 16 show the lines for the Caldwell and Chicago normal boys, the lines for all grades of mentally defective boys, and the A and B grades separately. The number at age appears at the bottom. Reading them, we find:

1. The normal boys in strength of grip in either hand are decidedly superior at each age to mentally defective boys as a group.

2. The "moron" or brighter class (A and B) is superior at each age, excepting eighteen (and this is due to an undue rise of

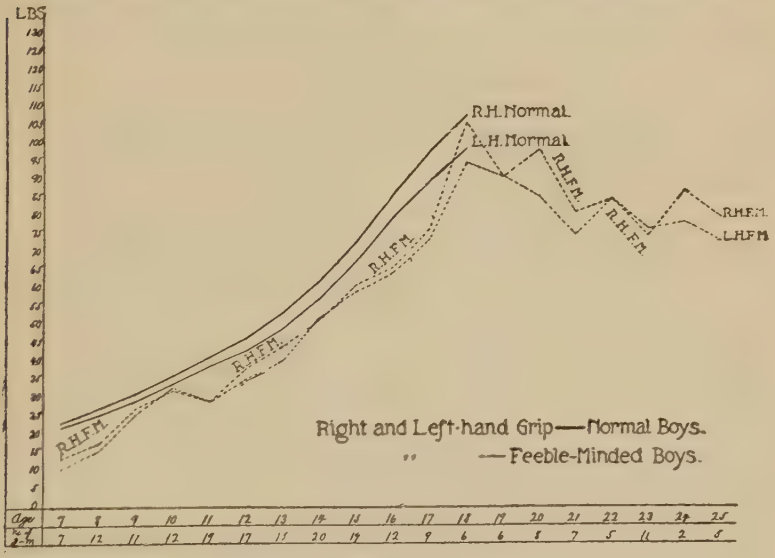

Fig. 17

one class and fall of the other class), to all defective boys as a group.

3. The divergence between the hands increases as a rule with age.

4. The irregularity and fall of the lines for all defective boys after eighteen years is due to the greater variability of this group and to the greater percentage of lower grade cases.

Charting the right and left hands of Smedley's Chicago normal boys, and the right and left hands of all defective boys, Fig. 17, we find:

1. The hands distinctly apart at each age with normals.

2. Much crossing and the hands more nearly alike with the defectives. (This would show more decidedly were the Caldwell normals used for comparison.)

3. The left hand of the normal boys superior to the right hand of defective boys.

In fact, were the left hand of normal girls and the right hand of defective boys from six to sixteen charted, we would find the normal girls superior in strength of grip with this hand at each age, with possible exceptions at the ninth or tenth year.

The same general conditions above would be found to exist with girls as with boys were we to chart the girls.

TABLE XV

AVERAGE GRIP FOR EACH HAND OF AGE AND GRADE

Age	7		8		9		10		11	
Grade	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
A	21	15.7	18.6	18.1	28.2	26.6	32.5	36.5x	37.3	41.3x
B	5	6.5	24	19.7	30.6	28	34.5	31	34	33.9
C	11.5	8	3	1	10	12x	27.5	27.5	20	19
D										
E									10	0
A to B	+	+	—	—	—	—	—	+	+	+
A to C, D or E	+	+	+	+	+	+	+	+	+	+
B to C	—	—	+	+	+	+	+	+	+	+

Age	12		13		14		15		16	
Grade	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
A	48.2	43.8	55.6	51.8	66.8	65.8	53.2	57x	75.4	69.6
B	37.2	36.4	39.4	36.6	51.2	52.1x	71.6	68.2	77	73.6
C	32.3	29.5	34	28.7	40.7	41.7x	54.3	50.3	47	51.2x
D					42	60x				
E					22	5	4	0		
A to B	+	+	+	+	+	+	—	—	—	—
A to C, D or E	+	+	+	+	+	+	—	+	+	+
B to C	+	+	+	+	+	+	+	+	+	+

+ Affirms that average grip of group of brighter is higher.
— Shows a negative result.
x Left hand or sinistrality.

TABLE XV—*Continued*

Age	17		18		19		20		21	
Grade	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
A.....			125	127x	122	130x	130	110	115	74
B.....	94	92.5	93.7	77.7	92	82	119	102.5		
C.....	83	76.6	123	124x	140	138			90	83
D.....			110	88	76	86	89	78.7		
E.....	33.5	34x			28	33x	68	58	63	69x
A to B.....			+	+	+	+	+	+		
A to C, D or E			+	+	—	—	+	+	+	—
B to C.....	+	+	—	—	—	—	+	+		

Age	22		23		24		25			
Grade	R.	L.	R.	L.	R.	L.	R.	L.		
A.....			107	98						
B.....			101	114.6x			130	130		
C.....	86	85	72.5	75.5x			80.5	67.5		
D.....	92.5	99.5x			80	72				
E.....	70	58	54.5	51.4	95	86	40	51.5x		
A to B.....			+	—						
A to C, D or E			+	+						
B to C.....			+	+			+	+		

	+	—	Balance
To 21 yrs. of age..			
A to B.....	17	9	8+
A to C, D or E	24	4	20+
B to C.....	22	6	16+

The above graphs picture all defective boys as a group and the two highest grades of mentally defective boys. Table XV shows the average strength of grip at age for each of the five grades of boys and for either right or left hand. Table XVI gives the same data "smoothed" by sums of three-year groups. A + affirms that the average grip of the brighter group is higher; A — shows the reverse; an x after the amount means the left hand was dominant, or sinistrality. The general fact shown by the tables is evident. The negative results were in some cases due to exceptionally large or heavy lower-grade children.

TABLE XVI

AVERAGE GRIP FOR EACH HAND AND GRADE "SMOOTHED" BY SUMS FOR THREE YEAR GROUPS

Age	7–8–9		10–11–12		13–14–15		16–17–18		19–20–21		22–23–24	
Grade	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
A	67.8	60.4	118	121.6	175.6	174.6	300.6	294.9	367	314		
B	59.6	54.2	105.7	101.3	162.2	156.9	264.7	243.8	316	276.8		
C	24.5	21	79.8	76	129	120.7	253	251.8	345	331.5	237.8	240.8
D											258.7	257.3
E									159	160	219.5	195.4
A to B	+	+	+	+	+	+	+	+	+	+		
A to C, D or E	+	+	+	+	+	+	+	+	+	—		
B to C	+	+	+	+	+	+	+	—	—	—		

	+	—	Balance
A to B	10	0	10+
A to C, D or E	9	1	8+
B to C	7	3	4+

PERCENTAGES OF DEFECTIVE BOYS REACHING OR EXCEEDING THE AVERAGE NORMAL BOY IN STRENGTH OF GRIP

When groups are compared by means of averages, the variability of the individuals in either group is neglected, and the overlapping is not shown. A useful common method of additional comparison is to ascertain the percentage of one group reaching or exceeding the median or average accomplishment of the other group. Table XVII below gives these data for the defective boys in comparison with both the Chicago and Caldwell normals. If defective boys did on the whole as well as normal boys, fifty per cent would reach the median or average of the normal group. A larger per cent is seen to reach the average result of the Smedley measures than those of the Caldwell boys. The Chicago group of school boys was very probably a much more miscellaneous group, including a greater percentage of inferior boys. The dominance of the left hand of the feeble-minded is noticed in 22.3 per cent reaching the average left hand score of the Caldwell boys as against 17.8 reaching the right hand score.

GRADUATE MEN AND DEFECTIVES COMPARED

The author wished to compare strength of grip in a group of "bright," heavy, working "boys," who constituted the most intelligent class of the Indiana Institution, and the strength of

TABLE XVII

Age	Cases	Chicago				Caldwell			
		Right		Left		Right		Left	
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
7	7	1	14.3	1	14.3	1	14.3	1	14.3
8	12	3	25	2	16.6	3	25	2	16.6
9	11	4	36.4	5	45.5	4	36.4	5	45.5
10	12	5	41.7	3	25	3	25	3	25
11	18	4	22.2	6	33.3	2	11.1	5	27.7
12	16	6	37.5	5	31.3	2	12.5	4	25
13	15	6	40	6	40	3	20	2	13.3
14	20	6	30	9	45	4	20	5	25
15	19	5	26.3	5	26.3	4	21.1	4	21.1
16	12	2	16.6	2	16.6	0	0.0	1	8.3
17	9	3	33.3	3	33.3	0	0.0	1	11.1
18	6	4	66.6	2	33.3	2	33.3	2	33.3
Total	157	49	31.2	49	31.2	28	17.8	35	22.3

adult graduate men students of Teachers College. He selected twenty-five of the largest defectives[1] who ranked either in the A or B grades of defect. Only seven of these boys were below twenty years of age; the others ranged from twenty to thirty-seven years. They were all accustomed to the heaviest daily work, "boiler room boys," or "outside workers." The graduate men were students with a pretty severe mental task daily before them. They were unaccustomed to manual labor. Tests with the dynamometer were made with thirty-three of these men. The ages ran from twenty-three to forty-two. The highest grip with either hand of two trials for each hand was taken.

The averages obtained were:

	No.	Age Years	Height Inches	Weight Pounds	Grip	
					R. H.	L. H.
Defectives	25	24.2	68.2	156.1	111.4	101.8
Graduates	33	33	69.2	159	125.9	118.9

[1] The following were the individuals: Numbers 250–272–197–273–213–268–284–276–234–177–277–214–215–204–235–222–280–229–274–164–286–176–198–236–199 of the list found in Chapter VI.

We see from these averages that graduate students engaged in mental work were stronger with either hand than larger mentally defective boys whose daily occupation was heavy manual work. Table XVIII gives the data for the graduate students from which part of the above table was derived.

TABLE XVIII

STRENGTH OF GRIP IN GRADUATE STUDENTS

No.	Age	Estimated Height	Estimated Weight	Grip	
				R. H.	L. H.
1	42	70.5	157	119	127
2	34	70.3	175	119	112
3	35	67.5	132	130	126
4	26	70.5	142	124	112
5	29	68	143	107	100
6	34	68	170	144	128
*7	25	71	175	135	144
8	29	69	150	111	114
9	31	67.5	155	130	110
*10	28	65	138	80	87
11	37	65.5	145	123	109
12	38	70.8	270	152	154
13	26	72	160	140	131
14	28	69	165	133	116
15	30	70.5	160	140	120
16	33	72	185	136	112
17	27	70	160	132	118
18	24	67.5	138	133	120
19	23	70	163	142	130
20	27	71	160	121	111
21	24	70	150	102	116
22	28	72	165	104	89
23	24	67	136	118	114
24	35	70	157	138	121
25	29	68	145	131	129
26	34	70.5	143	114	117
27	25	73	185	150	163
28	38	66	155	130	135
29	26	67	145	116	107
30	28	67	148	97	92
31	29	69	152	110	77
32	36	68.5	155	112	108
33	30	71	168	181	176

* Numbers 7 and 10 were left-handed.

PERCENTAGE OF "LEFT-HANDEDNESS" IN FEEBLE-MINDED BOYS

The mentally defective children were tested three times in respect to their use of either right or left hand. In a "ball

rolling test," a cardboard box with six three-ounce solid rubber balls was placed on the floor at a line behind which the child sat or knelt, but to his front and left. He picked up the balls from the box with the hand he preferred and rolled them as he wished wholly unconscious that the hand he used in rolling the balls was noted as well as his score. Which hand he used was recorded in two different trials. Following this the teacher of the boy was asked to note carefully which hand he gave preference to in writing or other manual work. Her observation was recorded. This would make three checks on each boy or, if ambidextrous, four checks. Of 148 boys from six to nineteen years of age inclusive, twelve, or 8.1 per cent, had three "left-hand checks" out of a possible three. We might say they were clearly left-handed. Ten, or 6.8 per cent, had two "left-hand checks," and one right-hand check. Three, or 2 per cent, were ambidextrous. Gould in his "Right-handedness and Left-handedness" says that 94 per cent of "children" are right-handed. This would leave six per cent left-handed. Miss Carman found five per cent of 756 boys of Saginaw, Michigan, left-handed. Of course, in these latter figures we have no means of telling how many were mentally deficient.

The relation of the opposite cerebral hemisphere to "handedness" is a most fascinating one. What is the significance of ambidexterity and sinistrality in the boy of deficient cerebral functioning? Ladd and Woodworth (14, p. 264) say that the left hemisphere has special culture in acts of skill and that "it may well enough be connected, both as cause and effect, with the prevalent right-handedness of the human species." We might say that fifteen per cent of mentally defective boys are left-handed as opposed to six per cent of normal children. There is less differentiation also between the hands of defectives than normals. Will we not have to associate sinistrality with a lower degree of mental and physical development? Juvenile delinquents show this trait. "Criminals are more often left-handed than honest men," Lombroso (15) claims. He says: "As asymmetry always grows in proportion to the development, and as the brain is among the organs which develop the most, it becomes more asymmetric the more it works. Therefore, as man advances in civilization and culture, he shows an always greater right-sidedness as compared to savages."

Conclusions

1. In strength of grip as shown with the dynamometer, normal boys and girls are, in either hand, stronger than mentally defective boys and girls.

2. Separating the brighter moron class from the defectives as a whole, we find the boys of the better group superior in strength of grip at each age than the group for all defective boys.

3. Divergence between the hands of defective and normal boys grows with age.

4. The hands of normal boys are distinctly apart at each age; the hands of mentally defective boys are not only closer, but they cross at some ages.

5. The heightened difference between the hands at early puberty shows in the defective group as in the normal group.

6. Not only are normal boys stronger in their left hand than mental defectives with their right, but normal girls are stronger in their left hand than are defective boys with their right hand. (There may be an exception to this at about the ninth or tenth year.)

7. Graduate students are stronger in either hand than large defective boys used to hard manual labor.

8. There is a higher percentage of left-handedness among mentally defective children than among normal children; we might say fifteen per cent to six per cent.

9. The power of sustained mental effort is weaker in the deficient than in the normal child and this general deficiency of brain power is reflected on the average in the strength of grip of the feeble-minded.

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CHAPTER V

PERCEPTION AND MEMORY IN RELATION TO GENERAL INTELLIGENCE

The "marking A" test and the memory of related and unrelated words were three of a series of mental tests given to "schoolable" mentally defective children in the Indiana School for Feeble-Minded Youth. These tests were practically identical with those given by Thorndike to normal children and Norsworthy to classes for defectives in New York City and to children of the Waverly (Massachusetts) School for Feeble-Minded. For purposes of this study the above tests were also given by the author to public school children in Caldwell, New Jersey.

The following form for the "A" test was placed face down on the desk of each pupil:

PERCEPTION

GAAQBEMPAZNBIBXGAIBRUSAWZAZWXAMBBDXAJB
BCNABAHGBVBVFTCLAYKUBBWAFRWBTQYYAFAAAOH
UOLJCCAKSBAUAFERFABAFZAWXBAAAVHAMBABAD
KBEBVNAPLILAOXBBJUOVBIVPAAPSBNLKRQAABJLE
AKBAAPBBAAAHYOAEBLBVFABJAEHNPBIBAYAQBK
UBDSHAAQBBHTABZAQGBBTPNBRQNZIJBBWYBRED
TBWAMBEABHAOPXZWCAIRBRZNBOQAQLMDGUSGB
FUOFAAKYFGTBBLBZBJAAVAUAACBBTVDACJSIUBMO
BNZBWAAABHACAXHXQAXTDBBTYGBKGKVLBKIB
JACINBVBGAOBHABBBEJCTQZAPJBEIQWNAHRBBIAS
YBQAQEABJUDFBIMWBSAUBBBAOABMABDYAABJDAB
OBKFIUDBHTAGDAACDIXAMRPAGQZTAABBAOWLYX
WABBTHJJANBBBAAMEAACBSBSKABLPHANBNBKAZF

To ascertain whether each knew a capital A, several capital letters were placed on the board and two or three pupils were called upon to come forward and draw a line under the A's. They were then told that the slip on their desk contained a number of letters "mixed up" and they were to turn (holding the paper) at

the signal and "draw a line under as many A's as they could find, working as fast as they could, but carefully." After exactly sixty seconds the papers were turned downward and names written. The slips were then immediately collected. The next day a similar test was given in marking B's. The above plan was followed with both groups of children.

The scores for each child appear in Chapter VI. An "F" means a failure. The sexes and ages are kept separate. The numbers given are identical with those in the other tables of Chapter VI so that the record of each individual in all tests, physical and mental, can be found. The dropping of a score in the mental tests means that the child did not take such test.

The results are summarized in Tables XIX and XX.

TABLE XIX

"A" Perception Test—Caldwell Children

(362 Cases)[1]

	Boys					Girls				
Age	Cases	Aver-age	A.D.	Me-dian	P.E.[2]	Cases	Aver-age	A.D.	Me-dian	P.E.[2]
6	1	21		21		1	23		23	
7	4	22.7	8.7	21.5	7.3	4	25.5	5	24	4.2
8	28	26.3	5.6	27.5	4.7	11	31.5	10.2	32	8.6
9	26	27.7	6.3	27.6	5.3	22	31.6	7.8	30.5	6.5
10	14	34.8	9.6	31.3	8.1	20	38.9	6.5	40	5.5
11	18	36.7	10	43.3	8.4	18	43.4	5.3	45.3	4.4
12	24	42.6	5.6	43	4.7	18	46.5	5.9	47	4.9
13	14	45.6	6.6	47	5.5	21	47.6	5.7	48	4.8
14	21	46.3	7.2	46	6.0	19	56.8	8.7	55	7.3
15	21	51.4	7.7	51	6.5	21	57.5	10.6	54	8.9
16	12	48.9	9.4	49	7.9	16	60.0	8.1	60.5	6.8
17	4	65.5	4	65.5	3.4	2	61	8	61	6.7
18						2	66.5	18.5	66.5	15.5
	187					175				

[1] For results in the same test with nine hundred normal children (Thorndike). See Psychology of Mentally Deficient Children, Norsworthy, p. 46.

[2] P.E.'s calculated by transmuting the A.D.'s. Same in Table II. (P.E. = .8453 A. D.)

TABLE XX

"A" Perception Test—Feeble-Minded Children

(190 Cases)

	Boys					Girls				
Age	Cases	Aver-age	A.D.	Me-dian	P.E.	Cases	Aver-age	A.D.	Me-dian	P.E.
8	2	7.0	1.0	7	.8					
9	5	11.6	3.0	11	2.5	3	12.3	3.7	14	3.1
10	10	16.2	4.0	15.5	3.4	3	21.0	2.0	21	1.7
11	12	13.5	6.5	10.5	5.5	6	30.7	8.7	26.5	7.3
12	10	17.8	9.2	17	7.7	7	36.7	7.7	37	6.5
13	14	19.4	7.9	21.5	6.6	1	19		19	
14	16	20.1	7.4	20.5	6.2	13	31.5	4.5	33	3.8
15	13	23.3	8.3	21	7	6	25.7	10.7	24.5	9
16	7	30.3	12.8	22	10.8	11	30.8	10.7	30	9
17	5	31.6	10.6	31	8.9	11	34.0	12.4	30	10.4
18	1	25		25		10	25.5	6.7	24.5	5.6
19	2	28.5	10.5	28.5	8.8	5	32.6	10.2	29	8.6
20						11	32.7	12.1	38	10.2
21						4	33.0	7	32.5	5.8
22						2	39.5	5.5	39.5	4.6
	97					93				

Using the average as a measure of central tendency, Tables XIX and XX become Fig. 18. It is not safe to draw other than the most general conclusions owing to the few cases at age. With this limitation, however, the following is offered:

1. Normal children are better at each age than mentally defective.

2. Normal children show a more rapid increase in ability with age.

3. Mentally defective girls show the same trait as known to exist in normal children: viz., girls are better than boys at each age. (See Table XI, p. 46, of Norsworthy, Psychology of Mentally Deficient Children.)

4. There may be less sex difference in the defectives after fourteen years.

5. One sex seems about as variable as the other.

A noticeable point in scoring the papers of both groups was that the Caldwell children were more accurate and consistent in marking the A's; they "skipped about" less.

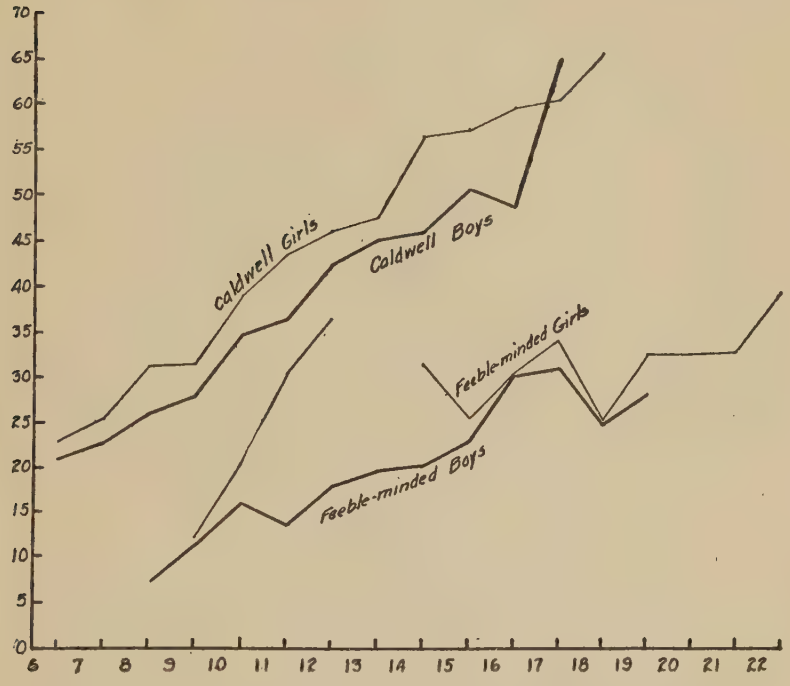

FIG. 18. "A" Perception Test—Normal and Feeble-Minded Boys and Girls

To show any "overlapping" in accomplishment between normal and feeble-minded children the following frequency tables and surfaces were made:

TABLE XXI

FREQUENCY TABLE—CALDWELL BOYS

"A" Perception Test

10 and 11 Years		12 and 13 Years		14 and 15 Years	
Score	Frequency	Score	Frequency	Score	Frequency
15–19.99	4	25–29.99	4	25–29.99	1
20	1	30	2	30	4
25	5	35	0	35	2
30	6	40	14	40	4
35	1	45	10	45	13
40	6	50	6	50	6
45	6	55	1	55	4
50	2	60	1	60	6
55	1			65	2
Number 32		Number 38		Number 42	
Average 33.9		Average 41.7		Average 46.9	
A. D. 9.8		A. D. 5.9		A. D. 7.6	
Median 32.5		Median 44.8		Median 49.4	
P. E. 7.93		P. E. 4.9		P. E. 6.4	

TABLE XXII

FREQUENCY TABLE—MENTALLY DEFECTIVE BOYS

"A" Perception Test[1]

10 and 11 Years		12 and 13 Years		14 and 15 Years	
Score	Frequency	Score	Frequency	Score	Frequency
0–4.99	1	0–4.99	2	0–4.99	0
5	5	5	3	5	3
10	5	10	7	10	8
15	6	15	7	15	7
20	5	20	7	20	7
25	2	25	6	25	3
30	0	30	6	30	5
35	1	35	1	35	4
40	0	40	2	40	2
45	0	45	0	45	0
50	1	50	1	50	1
Number 26		Number 42		Number 40	
Average 15.4		Average 19.6		Average 20.8	
A. D. 7.3		A. D. 8.7		A. D. 8.8	
Median 17.1		Median 21.8		Median 21.8	
P. E. 6.2		P. E. 7.3		P. E. 7.4	

[1] The tables include thirty-three mentally defective boys of Norsworthy's tests—pp. 30–33, Psychology of Mentally Deficient Children.

FIG. 19

Marking A's—10 and 11 Year Old Boys

---- Feeble-Minded

—— Caldwell Normal

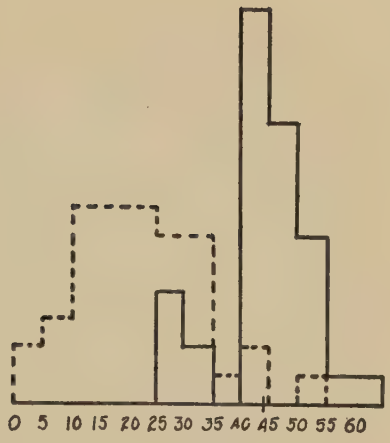

FIG. 20

Marking A's—12 and 13 Year Old Boys

---- Feeble-Minded

—— Caldwell Normal

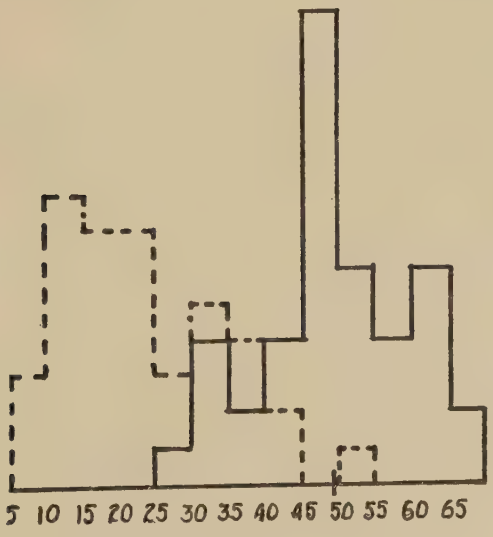

FIG. 21

Marking A's—14 and 15 Year Old Boys

– – – Feeble-Minded

—— Caldwell Normal

Figs. 19, 20, and 21 show from one to three feeble-minded boys reaching or exceeding the median normal, with many of the latter doing poorer than the best defectives. In general, the defectives simply occupy the lower end of the distribution curve for normal children. In these three diagrams, 5.5 per cent of defective boys from ten to fifteen years inclusive reach or exceed the median normal in perception. Counting the percentage of all defective boys from ages eight to sixteen inclusive, who reach or exceed the median normal boy at the same age, we have 2.2. With defective girls from nine to eighteen years inclusive, 4 per cent reach or exceed the median normal girl in ability to mark A's.[1]

Memory of Related and Unrelated Words

The Caldwell children and mentally defective children were tested also in memory. The four lists of related and unrelated words given below were read aloud to a class, about ten seconds time being taken in reading a list. Each of the four lists was given on a different day. The children were told to lay their pencils down and listen carefully to the words read; after the reading, to take their pencils and write all they could remember. They were told to take what time they needed. About three minutes were found sufficient. With those defective children below the "third reader" the lists were read to each child individually and his oral response checked on a blank form. This was done because writing was difficult below this grade. In the oral work the children were usually through in from one to two minutes.

Memory Test

Related Words		Unrelated Words	
A	B	A	B
river	school	bed	long
water	teacher	duy	green
brook	book	say	arm
flow	desk	never	inch
ice	pen	ring	dress
cold	read	boy	run

[1] Norsworthy found nine per cent for both boys and girls.

MEMORY TEST—*Continued*

RELATED WORDS		UNRELATED WORDS	
A	B	A	B
winter	write	sick	true
snow	add	tree	knife
sled	spell	dog	break
skate	word	can	friend

For purposes of comparison the scores of words right were combined in each pair of tests. No penalty was made for words added that were wrong. Each child's score can be found in Chapter VI. The possible maximum is twenty for each of the two groups of words. In the case of vowel sounds in words being very similar, the pupil was credited with the word. For example, in the second unrelated list quite a number gave "through" for "true." This was done with both groups of children. The number of cases at each age, together with the Average and A. D., the Median and the P.E. for boys and girls separately, normal and defective, are shown in Tables XXIII to XXVI.

TABLE XXIII

MEMORY OF RELATED WORDS—CALDWELL CHILDREN

(173 CASES)

	Boys					Girls				
Age	Cases	Aver-age	A.D.	Me-dian	P.E.	Cases	Aver-age	A.D.	Me-dian	P.E.
7	2	10.0	1.0	10.0	1.0	1	11.0		11.0	
8	8	12.0	2.5	12.5	2.5	6	14.2	2.5	15.5	2.0
9	13	11.2	2.4	11.0	2.0	14	12.3	3.2	14.5	1.5
10	12	11.8	2.4	13.3	2.1	13	13.8	2.4	13.0	3.0
11	16	15.5	1.9	16.5	1.8	10	14.1	1.3	14.5	.9
12	15	15.5	1.4	15.9	1.0	17	15.9	1.6	16.5	1.4
13	6	14.8	1.2	15.3	.4	13	15.5	1.9	16.3	2.0
14	14	14.5	2.2	15.7	1.3	3	16.3	1.0	16.0	1.0
15	3	14.0	2.0	15.0	1.0	5	16.4	.9	17.3	.3
16	1	12.0		12.0		1	12.0		12.0	
	90					83				

TABLE XXIV

Memory of Unrelated Words—Caldwell Children

(169 Cases)

	Boys					Girls				
Age	Cases	Aver-age	A.D.	Me-dian	P.E.	Cases	Aver-age	A.D.	Me-dian	P.E.
7	2	8.0	2.0	8.0	2.0	1	10.0		10.0	
8	7	10.1	1.3	10.3	1.0	6	13.3	1.7	12.5	1.5
9	13	10.0	1.2	10.0	1.0	14	11.3	1.8	11.5	1.0
10	12	9.6	2.1	9.5	1.5	12	12.3	1.8	14.0	2.0
11	16	12.8	1.8	13.5	1.6	10	12.0	1.6	13.2	1.2
12	14	12.4	1.9	13.2	1.3	16	13.0	1.8	13.5	.8
13	6	11.2	1.5	11.5	1.0	13	13.2	1.4	13.3	1.5
14	14	11.7	1.3	12.3	1.0	3	14.3	1.7	15.0	1.0
15	3	13.7	1.0	14.0	1.0	5	14.4	.5	14.6	.5
16	1	13.0		13.0		1	12.0		12.0	
	88					81				

TABLE XXV

Memory of Related Words—Mentally Defective Children

(223 Cases)

	Boys					Girls				
Age	Cases	Aver-age	A.D.	Me-dian	P.E.	Cases	Aver-age	A.D.	Me-dian	P.E.
7	4	7.8	2.3	7.5	2.0					
8	7	8.0	1.7	7.5	1.5	2	8.0	.0	8.0	.0
9	8	9.3	2.0	9.5	1.3	4	8.3	1.3	8.0	1.0
10	11	10.0	2.2	10.0	2.0	5	9.0	.8	9.0	1.0
11	12	10.2	2.7	11.8	2.5	6	11.3	1.7	12.3	1.3
12	9	10.1	1.6	11.0	1.3	11	9.2	2.4	10.0	1.0
13	14	10.6	2.3	11.7	1.7	5	8.6	2.2	8.5	2.5
14	18	11.2	1.8	11.6	1.7	13	11.2	1.7	11.0	1.0
15	15	11.1	1.7	11.5	1.5	8	12.4	2.4	12.5	2.0
16	8	12.9	2.6	13.5	2.5	11	12.0	2.7	12.0	3.0
17	5	12.2	2.2	11.0	1.5	13	11.8	2.4	12.4	2.0
18	1	11.0		11.0		9	12.0	2.4	12.0	2.0
19	2	12.0	1.0	12.0	1.0	5	11.4	.4	11.5	.5
20						11	14.1	2.1	14.5	1.7
21						4	13.3	2.8	13.0	2.5
22						2	15.0	2.0	15.0	2.0
	114					109				

TABLE XXVI

MEMORY OF UNRELATED WORDS—MENTALLY DEFECTIVE CHILDREN

(218 CASES)

	Boys					Girls				
Age	Cases	Aver-age	A.D.	Me-dian	P.E.	Cases	Aver-age	A.D.	Me-dian	P.E.
7	4	6.8	.3	7.1	.0					
8	7	7.7	3.1	7.0	3.0	2	3.5	.5	3.5	.5
9	8	6.9	2.1	6.5	1.8	4	5.5	.8	6.3	.0
10	10	8.4	1.7	8.3	1.5	5	7.2	1.4	8.0	1.0
11	12	9.1	1.9	9.2	1.0	6	8.3	1.7	7.8	1.0
12	9	7.6	1.9	8.3	1.5	10	7.4	2.2	7.5	1.5
13	14	9.2	2.1	9.4	2.5	5	7.2	2.6	7.0	3.0
14	18	8.8	1.8	9.3	2.0	14	10.4	1.4	10.5	1.0
15	15	8.7	1.7	9.0	1.0	8	10.6	2.9	10.5	2.0
16	8	9.6	2.9	8.0	2.0	10	9.4	2.2	9.5	1.7
17	4	9.3	3.3	9.0	3.0	13	10.2	2.3	10.0	2.0
18	1	12.0		12.0		9	11.2	1.3	11.8	1.0
19	1	10.0		10.0		5	10.8	1.0	11.5	.5
20						10	12.7	3.1	11.5	2.0
21						4	10.8	2.3	10.5	2.0
22						2	13	2.0	13	2.0
	111					107				

FIG. 22. Memory of Related Words
Normal and Feeble-Minded Boys and Girls

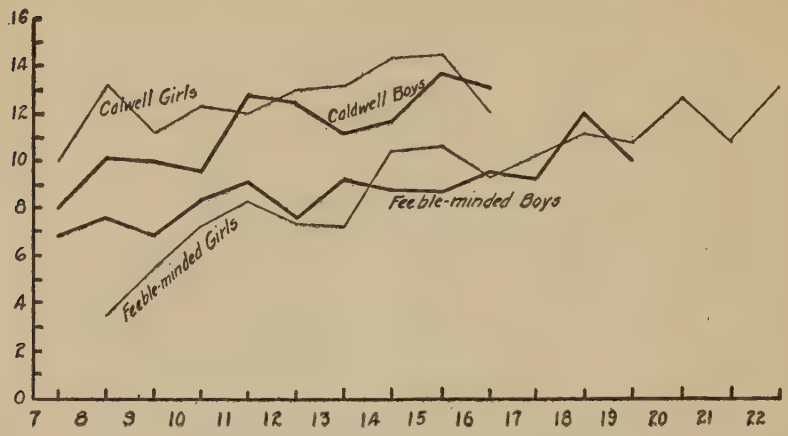

FIG. 23. Memory of Unrelated Words
Normal and Feeble-Minded Boys and Girls

Tables XXIII–XXVI are pictured in Figs. 22 and 23. The averages are used. As in the perception test, few frequencies at the age permit of only general interpretation. Bearing this in mind the charts interpreted might be read:

1. Mentally defective children fall short of the average accomplishment of normal children in memory of related and unrelated words at each age from seven to fifteen.

2. Normal girls are better in memory than normal boys with a possible exception at about the eleventh or twelfth year. (The irregular curves might be criticized here; yet Thorndike, using the median as a measure of central tendency in similar tests with 288 children, found one exception at the twelfth year in memory of related words. "Psychology of Mentally Deficient Children," p. 48.)

3. Sex differences seem to be less marked with the feeble-minded.

4. Growth from year to year appears about the same in both groups.

5. "High grade" feeble-minded adults are not much better in memory than eight-year-old normal children.

To show that mentally defective children occupy the lower end, more or less, of a regular distribution of children in general a random sampling of ages was taken. The frequency tables and surfaces follow.

TABLE XXVII

FREQUENCY TABLE—CALDWELL BOYS

Memory of Related Words

10 Years		11 Years		12 Years		13 Years		14 Years	
Score	Frequency	Score	Frequency	Score	Frequency	Score	Frequency	Score	Frequency
8–8.99	2							8–8.99	1
9	1							9	1
10	2							10	0
11	1	11–11.99	1					11	0
12	0	12	0	12–12.99	1			12	1
13	2	13	3	13	1	13–13.99	1	13	0
14	2	14	1	14	2	14	2	14	3
15	1	15	2	15	4	15	2	15	2
16	1	16	3	16	3	16	0	16	3
		17	2	17	2	17	0	17	1
		18	4	18	1	18	1	18	1
				19	1			19	1
Number 12		Number 16		Number 15		Number 6		Number 14	
Average 11.8		Average 15.5		Average 15.5		Average 14.8		Average 14.5	
A. D. 2.4		A. D. 1.9		A. D. 1.4		A. D. 1.2		A. D. 2.2	
Median 12.5		Median 16.5		Median 15.9		Median 15.25		Median 15.7_5	
P. E. 2.1		P. E. 1.8		P. E. 1.0		P. E. .44		P. E. 1.3^5	

TABLE XXVIII

FREQUENCY TABLE—MENTALLY DEFECTIVE BOYS

Memory of Related Words

10 Years		11 Years		12 Years		13 Years		14 Years	
Score	Frequency	Score	Frequency	Score	Frequency	Score	Frequency	Score	Frequency
6–6.99	1	6–6.99	1			6–6.99	2		
7	1	7	3	7–7.99	1	7	1		
8	2	8	1	8	1	8	0	8–8.99	3
9	1	9	0	9	2	9	2	9	2
10	1	10	0	10	1	10	1	10	2
11	1	11	2	11	2	11	2	11	4
12	2	12	2	12	1	12	3	12	2
13	1	13	2	13	0	13	1	13	1
14	1	14	0	14	1	14	0	14	2
		15	1			15	2	15	2
Number 11		Number 12		Number 9		Number 14		Number 18	
Average 10.0		Average 10.2		Average 10.2		Average 10.6		Average 11.2	
A. D. 2.2		A. D. 2.7		A. D. 1.6		A. D. 2.3		A. D. 1.8	
Median 10.0		Median 11.8		Median 11.0		Median 11.75		Median 11.6	
P. E. 2.0		P. E. 2.5		P. E. 1.3		P. E. 1.7		P. E. 1.7	

Fig. 24 shows the surfaces for boys for ages ten to fourteen inclusive. In each case defective boys reach or exceed the median normal, or closely approach it. Much overlapping is noticed. Counting all defective boys from seven to sixteen years inclusive, 8.5 per cent reach or exceed the median normal boy in memory for related words. For defective girls from eight to twenty-two years inclusive the per cent reaching or exceeding the median

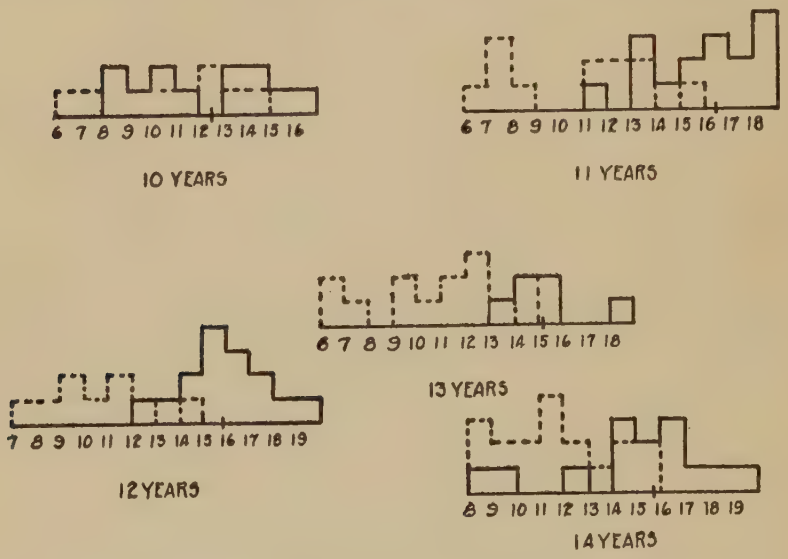

Fig. 24. Memory of Related Words—10 to 14 Year Old Boys
– – – Feeble Minded
—— Normal

normal girl is 7.3.[1] In memory of unrelated words the per cent of defective boys from seven to sixteen years who reach or exceed the median normal is 12.4. For defective girls from eight to twenty-two years, 13.1 per cent reach or exceed the median for normal girls.[2] In tabular form this appears:

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[1] and [2]—From age sixteen to twenty-two the median normal "adult" accomplishment for girls was used for comparison.

PER CENT OF DEFECTIVES REACHING OR EXCEEDING MEDIAN NORMAL IN MEMORY OF RELATED AND UNRELATED WORDS

	Age	Related	Unrelated
Boys	7 to 16	8.5	12.4
Girls	8 to 22	7.3	13.1

In memory probably more than in the accuracy and quickness of perception defective children seem to occupy the lower end of an extended distribution curve. Two factors operated also in the "A" test with the feeble-minded to keep the score lower than it might otherwise have been. One was the question of motor control in handling the pencil with some of these children; and the other was the direction to do "carefully" the marking. In all their regular school work these children were admonished to take their time and be careful with their work. This no doubt modified the results in the "A" test. These factors of course would not enter in the memory test.

The question arises as to whether or not relations appeal to mentally defective children in memorizing. The above table would tend to the negative interpretation. From another angle we note the per cent of boys and girls of both groups who in remembering unrelated words, did as well as or better than they did in remembering related words:

	Defectives	Normal
Boys	28 per cent	21.6 per cent
Girls	30 "	23.4 "

The second list of related words pertains to the school room, but the word "pencil" was not included. In addition to this the word "pen" offered the suggestion and the stimulus for the response "pencil." Forty-two out of one hundred and seventy-three Caldwell children, or 24.3 per cent, gave the word pencil in this test. Thirty-six out of two hundred and twenty-three defective children, or 16.1 per cent, gave the word pencil. In the second list of unrelated words "green" appears. Eleven out of one hundred sixty-nine Caldwell children, or 6.5 per cent, included the word "grass" in their responses. Fourteen out of two hundred and eighteen defective children, or 6.4 per cent, also included the word "grass." There is little difference in this last, but a more decided difference in the case of related words. Again, practically all the wrongly added words by the normal children

bore relation to words in the list responded to. This was much less noticeable with the defective children.

As a practical suggestion from the above data, and with a firmer conviction after six years' experience in the education of hundreds of mentally defective children, the author would offer the point that in the ability to perceive and to memorize defective children do better than in any other of the more purely mental traits. It makes less difference with these children whether the material has relationship than it does with normal children. Memory seems to be a characteristic in itself, native perhaps. It is a common occurrence to have defective children call their teacher's attention to any slight change in the latter's dress. The powers of perception and memory then should be used to the utmost in the education of these children. The most practical contribution made by Miss Norsworthy in her study is quoted: "To speak of (defectives) then as being equally deficient in all the mental powers is false. . . . From the point of view of the psychologist and the educator it is fully as important to know that the (defective's) perceptive powers are almost two and a half times as strong and accurate as his intellectual powers and almost half as strong again as his powers of memory, as to know that he is weaker than the ordinary child in all of these particulars."

Summary

As a summary to this study on the "Ability of Children in Perception and Memory" the following is offered:

1. Normal children are better at each age than mentally defective children in the powers of perception and memory.

2. Girls are better than boys in perception, whether they be normal or defective. The same is true with normal children in memory. (Note possible exception at eleventh or twelfth year.) With defective children this may not hold.

3. Sexes differ less with the feeble-minded.

4. "Schoolable" mentally defective children at sixteen or eighteen years are not much better in these powers than normal children at eight years.

5. Defective children occupy the lower end of a larger distribution curve for children in general.

6. The best mental powers which defective children are likely to "bring to school" are those of perception and memory.

CHAPTER VI

INDIVIDUAL RECORDS

For purposes of record, data in several other tests are included in Tables XXIX to XXXVI. The number of an individual is the same in both of the tables that concern him. The manner of giving and scoring the tests is also here given.

1. Pulse rate for one minute (with the feeble-minded).—Taken at about the same time on two successive days, thirty seconds and doubled. In case of any subnormal result, or any showing more than twenty above the seventy-two mark, the pulse was taken on a third day at the same hour as previously taken. The pulse was taken by the author, or the teacher in physical training, or the resident physician, or the interne.

2. Temperature (with the feeble-minded).—At the beginning and close of a half-day of school work, about two hours apart on the same day. One-minute thermometers were left in the mouth from one and a half to two minutes. Each subject was instructed to "hold tight under tongue," as we placed the thermometer. The temperature was taken by the physician or interne, or the author.

3. "Muscular memory" (with the feeble-minded).—Three trials seated with first or second finger of each hand on a verified yard stick with weight at the twenty-sixth inch mark. Eyes turned away and closed. At the fourth trial the weight was removed and the subject was told to "try to stop at the same place."

4. Maze tracing (with feeble-minded and Caldwell normal children).—At the beginning and the close of a half-day of school. Two minutes for each test. The children were told to draw a line between the two lines of the maze without touching either and to work as fast as they could. A sample was placed on the board to illustrate. The defective children, perhaps because of constant admonitions of their teachers in the course of their regular school work, generally "took more pains" and worked

more carefully in this test than the normal children. In scoring, a "touch" was "where white does not show through." Three grades of touches were weighted:

I. "Just a touch," as to point in turn, or some overlapping of pencil line and maze line, counted one.
II. Where pencil line was "lost" in maze line, counted two.
III. When pencil line "broke out" and again entered maze lines, counted three touches.

The score for amount was the amount inclusive of the last unit completed. An X means finished within the two-minute limit. For the style of maze and the scheme of units of amount marked, see Norsworthy's Psychology of Mentally Deficient Children, pp. 25 and 109.

5. Noun Test (with the feeble-minded).—Ability to form abstract ideas. Two tests. About three minutes given. (No set time). "Mark an X after every word that is the name of 'something.'" The words "book" and "on" were written on the board and children asked which should and should not be marked. This was to make sure that they understood. Slips containing the following words were given out:

Noun Test 1	Noun Test 2
book	black
read	desk
one	good
hat	stone
doll	sweet
tree	dress
if	run
cup	dish
ball	chair
is	going

In scoring, the scores from the two sets were added. A perfect score would be eleven. One was counted off for each wrongly marked word. In case the child marked all in list 2 his score for this list would be "0," but if he did the same in list 1, he would still have a score of two in the first list. In such a case, where it meant the child did not comprehend, he was scored "0."

6. Ability to form associations (with the feeble-minded). The following words were on individual slips:

ASSOCIATION

Tell me something that is:

high	wooden
soft	loud
cold	long
good to eat	fun
smooth	bitter
red	rough
round	sweet
hard	white
clean	heavy
dirty	pretty

These words were read to the pupils, together with the direction. Samples on the board "high" and "black" illustrated the point. Time—ten minutes. No erasures were allowed.

TABLE XXIX

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
1	6	7	C	40.8	39	2	0	1	3				
2	7	4	C	46.5	53	15	11	1	2				
3	7	0	C	48	54	8	5	3					
4	7	0	B	39.9	35	1	6	3					
5	7	11	B	45.1	53	9	7	3		3	1	4	3
6	7	11	C	46	50								
7	7	11	A	52.8	69	31	22	3		7	5–1	4	3–1
8	7	0	A	44	47	11	11	3		3	5–1	2	4
9	7	7	A	47	55	21	14	3		4	3	4	3
10	8	1	A	47.4	55	12	12	3		5	5	6	6
11	8	2	B	49.5	57	35	18	3		5–1	7	7	6
12	8	3	A	46.8	58	15	16	3		3	3	3	4
13	8	*	A	48.4	56	12	10	3		3	4	3	1–1
14	8		A	50.5	70	30	32	3		4	3	2	2
15	8	0	A	46.6	55	17	15	3		3	3	3	2–1

* Blank means month unknown.

TABLE XXIX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
16	8	11	C	48.9	54	1	1	3					
17	8	7	A	46.8	58	26	24	3					
18	8	10	B	51.5	69	30	30	3		4–1	4	5	4–1
19	8	2	C	47		5	1	3					
20	8	1	B	47.5	57	20	16	3					
21	8	0	B	49.9	61	11	15	1	2				
22	8	8	E	47.1	54								
23	8		E	45.5	49								
24	9		B	52.8	70	40	30	2	1				
25	9	9	C	49.3	58	10	12	3					
26	9	7	A	46.8	53	20	18	3		4	4	4–2	3–2
27	9	2	B	53.5	65	30	27	2	1				
28	9	4	A	49.8	62	17	20		3	4	3–1	2–3	3
29	9	1	B	49.3	54	20	16	3		2	3	2	1
30	9	7	A	52.6	69	38	35	3		6	7–1	7	5–1
31	9	3	B	50.4	59	19	23	3		6	6	3	2
32	9	10	B	56.3	83	44	44	3		5–2	4–3	2–3	4
33	9	5	A	51	65	30	30	3		5	5	5	3–1
34	9	4	A	53.6	69	36	30	3		6	4–1	4	5
35	9		E	47.8	53								
36	9		E	48	50								
37	9		E	49.5	54								
38	10	1	B	51.6	69	24	33	3					
39	10	0	A	51.9	67	37	44	3		5–1	7–1	3	4
40	10	9	C	49.6	65			1					
41	10		B	49.9	63	24	25	3		6–1	6	3	4
42	10		C	52.5	64	30	30	2	2	4	6	4	6
43	10	2	B	53.8	71	40	32	3		2	6–1	3–1	2–1
44	10	10	A	50.5	60	22	26	3		8	6	6	2–1
45	10	7	A	53.6	74	48	50	3		6–2	5	5	6
46	10	6	B	54.9	89	50	33	3		3	4	3	5–1
47	10	11	C	53.5	68	25	25	3		3	3	4	
48	10	2	A	52.3	63	30	31	2		5–1	4	5–1	5
*49	10	3	A	52	62	20	31	3		5–1	8	4–1	3
*50	10	3	A	52	63	38	37	3		4	4–1	5	6
51	10	11	A	54.6	70								
52	10		E		50								
53	10		E	51.3	62								
54	10	7	E	48.3	54								
55	10		E	48.6	54								
56	10		E		71								
57	10		E		59								
58	10		E	49.5	60								

* 49 and 50 are twins. Teacher judged 50 the "brighter."

TABLE XXIX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L. H.	R.	L.	A R-W	B R-W	A R-W	B R-W
59	11		D	57	82								
60	11		E	40	42								
61	11	9	E	52.3	67								
62	11	8	A	56.4	85	44	58	3		8	7	6	7
63	11	3	B	55.4	66	31	33		3				
64	11	6	B	47.9	58	21	15	3		5–1	6	5–2	4–3
65	11	7	B	53.9	76	24	20	3		3	4	4–1	5
66	11	8	C	52.8	63	24	26	3		5	6–2	8–2	4–1
67	11	9	A	53.8	72	46	42	3		6–1	6	4–1	5–2
68	11	5	B	54.3	76	34	28	1	2	3–5	4–1	5–3	3
69	11	8	B	55.8	69	33	30	3		6	7	5	3–2
70	11	3	B	51	67	para*	56		3	4	3	6	5
71	11	8	B	57.3	92	51	43		3	4–4	4–2	2–3	0–2
72	11	11	B	52	68	35	31	3		6–1	7	4–4	4–3
73	11	6	A	53.8	70	22	24	3					
74	11	5	B	55.4	81	42	42		3	6	6	6	6
75	11	4	B	53.6	73	35	43	3	1	2	4	5	3–2
76	11	10	C	50.5	62	14	7	3					
77	11	10	C	51.5	63	17	21	3					
78	11	6	C	50.8	65	17	13	3					
79	11		E	51.4	69	10	0						
80	11	4	C	54.5	62	28	28	2	1				
81	12	0	B	56.3	77	26	28	3					
82	12	8	C	54	67	22	22	3					
83	12	10	C	50	67	19	18	3					
84	12		B	50.4	67	20	25	3		5–1	4	3	2–2
85	12	3	B	55	74	43	39	3		4	4–1	3–1	5
86	12	2	B	57.5	80	51	50	3		6	6–1	3–4	1–3
87	12	11	A	58.6	70	34	33	3		4	6	4–1	6
88	12	5	A	57.3	85	45	42	3		4	5	5	3
89	12		E	46.3	57								
90	12		A	55.3	78	52	50	3		6	8–1	4–1	5–1
91	12	6	C	54	68	28	22	2					
92	12		E		52								
93	12	4	A	58.4	84	52	44	3		5–1	6	4–2	2–3
94	12	11	A	61.8	94	58	50	3		5–1	6–2	4–2	6
95	12	5	C	51.9	65	25	19	1	2				
96	12	7	C	64	121	70	68		3				
97	12	3	C	55.6	87				3				
98	12	7	C	59.1	92	42	40	3					
99	12	10	B	54.5	94	46	40	3		3–1	4–1	5	3
100	13	2	B	50.9	60	21	18	3		5	4	5	2
101	13	2	A	58.8	91	63	55	3		3	3–1	6	5–3
102	13	4	B	57.5	80	30	35	3		4–1	3	3–2	4
103	13	6	B	53.8	67	33	35	1	2	3	3–1	4–3	3
104	13	6	A	61.8	103	66	58	3		7–1	5–1	2–1	4

* "Para" means "paralytic."

TABLE XXIX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
105	13		B	57.1	82	53	35	3		5–3	5–2	5–5	4–3
106	13	0	C	53	66	33	22	3		5	6	4–1	5
107	13	10	C	59.8	81	35	38	2	1	6–3	3–1	5–3	4–2
108	13	5	C	56	79	48	37	3		5–2	6–3	6–4	3–1
109	13	11	C	60.5	94								
110	13	0	C	59.1		20	18	1					
111	13	5	B	59.5	87	60	60	2		5	7	2–4	3
112	13	1	A	60.6	93	56	50	3		7	8	6	6
113	13	8	A	64.1	103	45	50	3		6	7	7–1	5
114	13	6	A	53.4	76	56	50	3		6	6–3	8	6–1
115	13	6	A	62.5	104	48	48	3		8–1	7–2	5–4	7–3
116	13		E	49.3	54								
117	14	2	E	50.5	58								
118	14	1	E	56	91								
119	14		E	55	55								
120	14	0	B	55.3	73	48	48		3	3	5	3	1–2
121	14	0	C	54	69	18	20	3		5–3	3	4	4
122	14	6	B	53.1	65	31	42	3		4–1	7–5	3–3	4
123	14	3	C	58.8	89	40	52		3	6–3	5–3	3–2	2–1
124	14	4	B	61.9	122	75	66	1	2	6	5–1	5	4–1
125	14	10	B	56.1	85	50	40	3		5–2	6	6	4–1
126	14	0	A	58.5	97	54	57	3		7	6	3	4
127	14	10	B	57.6	77	31	31	3		4	6	6	5–1
128	14	5	A	56.9	70	41	37	3		6	4	5	3–1
129	14	9	C	61	109	67	62	1	2	7–2	7–1	5–3	6
130	14	7	B	64.3	97	63	62	3		7	8–1	5–2	4–5
131	14	4	C	56	86	38	33	3		5–1	7–1	5	4–3
132	14		B	63.8	111	70	80	1	2	5	4–1	4–2	3–3
133	14	1	A	65.4	106	60	90		3	4–1	5	4	4
134	14	2	A	60.6	93	58	52	3		6	6	5–4	6–3
135	14	9	A	64.3	131	97	81	3		8	7–3	7–2	5–2
136	14	3	B	57.5	83	42	48	3		4	4–1	4	5
137	14	10	A	65.3	123	90	78	3		6	8	5	8
138	14		E	53.8	79	22	5						
139	14		D	66.8	129	42	60						
140	14		E	53.8	65								
141	14		E		48								
142	14		E	44	48								
143	15		E	59.4	101								
144	15		E	65.9	100								
145	15	1	B	62.5	103	61	52	3		6	3	4	4
146	15	1	A	63.1	93	43	para	3		6–2	6–3	4–1	4–2
147	15	10	B	64.6	139	98	101	3		4	5	4	1
148	15	9	C	66.8	122	59	58	3		6–4	5–4	5	3–1
149	15	10	B	62.8	115	52	55	3		6	7	6–1	4

TABLE XXIX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
150	15		E	49.3	55								
151	15		E	48	57								
152	15	3	C	60.5	86	48	50	3		4	4	3	3
153	15	6	B	66	123	94	84	3		8–1	3–4	5–5	5–1
154	15	3	B	57.9	99	28	25	1	2	6–3	4–2	4–3	5
155	15	2	B	57.8	96	55	47	3		2–4	7–2	6–2	5–2
156	15	8	B	62.3	113	64	63	1	2	7–4	6–9	5–6	5–1
157	15	2	B	64	98	25	32	3		4	5	3–1	5
158	15	2	B	67.1		50	59		1				
159	15	6	A	60.4	93	42	53	3		6	5	5–2	2–2
160	15	5	A	56.5	85	41	50		3	5	6	3–1	4
161	15	9	B	67	150	125	122	3		7	7–1	6–1	6–1
162	15	9	A	65.5	109	87	68	3		7	9–4	6–3	6–2
163	15		E	53.6	65	4	0						
164	15		B	67.6	178	136	110						
165	15	11	C	56.5	104	56	43	3					
166	16	0	C	60.9	96	20	25	3					
167	16	2	C	61.5	109	62	75		3				
168	16	10	B	64.9	128	80	71	3		5–1	5–1	4–1	5–1
169	16	9	C	59	94	42	34	3		5	5–1	2–3	4–2
170	16	8	B	66	123	73	75	3		4–1	4–1	3–2	4
171	16	0	A	57.5	81	51	46	3		5	8	3–2	4–3
172	16	4	C	62.8	111	64	71	3		8–1	7–1	6–3	8–1
173	16		A	64.5	120	78	73	3		10–1	7–1	6–3	7–2
174	16	1	A	68.3	141	100	81	3		10	6	6–2	8–2
175	16	8	B	68.8	130	78	75	3		7–2	7–1	3–2	4
176	16		A	67	127	50	47						
177	16		A	69	152	98	101						
178	16		E	52.4	55								
179	16		E		62								
180	16		E	59.5	82								
181	16		E	61.3	103								
182	16		E	56.3	68								
183	16		E	62	102								
184	17	7	B	62.9	155	103	105	3		4–1	6	2–1	4
185	17	0	B	66.6	139	90	88	3		10	7–2	6	6–1
186	17		C	61.4	106	70	62	3		5–1	5	5	1–1
187	17		E	49.3	52								
188	17		E	60.6	88								
189	17		B	65.5	124	82	85	3		7–4	6–7	7–5	6–7
190	17	6	B	68.1	141	101	92	3		5	6		
191	17		E		84	30	32						
192	17		C	72.6	154	80	75						
193	17		E	65.3	111	37	36						
194	17	0	C	66.9	134	99	93	2					
195	18		B	63.9	123	80	71	3		6	5–5	7–3	5–4
196	18		B	66.4				3					
197	18		A	70	162	125	127						
198	18		B	67.8	136	86	70						

TABLE XXIX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
199	18		B	66.9	140	115	92						
200	18		C	64	127	123	124						
201	18		D	68.4	137	110	88						
202	19	1	B	66.4	130	67	62	3		3–1	8–1	6	4–3
203	19	0	A	65.5	150	122	130	3		7–1	6–4		
204	19		B	69.3	151	117	102						
205	19		E	59.3	100	28	33						
206	19		C	68	204	140	138						
207	19		D	66	134	76	86						
208	19		E	51	58								
209	19		E	63.4	106								
210	19		E	64.6	110								
211	20		E		127								
212	20		E	66	108								
213	20		A	71.6	172	130	115						
214	20		B	64.9	152	120	112						
215	20		B	67.4	114	118	93						
216	20		D	65.5	124	30	24						
217	20		D	68.8	146	115	110						
218	20		D	64	125	103	100						
219	20		D	65.9	150	108	81						
220	20		E	64.8	115	68	58						
221	21		D	64.8	112								
222	21		A	65.1	131	115	74						
223	21		C	63.1	124	84	87						
224	21		E	66.3	124	50	52						
225	21		C	68	131	88	83						
226	21		E	67	148	108	118						
227	21		C	69.6	134	98	78						
228	21		E	65.8	132	30	37						
229	22		C	71.1	169	72	88						
230	22		C	66.3	156	100	82						
231	22		D	68.6	125	72	83						
232	22		E	63.5	114	70	58						
233	22		D	64.4	133	113	116						
234	23		B	70	165	120	152						
235	23		A	69.3	143	107	98						
236	23		B	64.1	134	103	100						
237	23		E	68	142	22	15						
238	23		E	65.5	133	52	45						
239	23		C	65.3	123	60	70						
240	23		E	65.3	119	28	29						
241	23		C	66.6	133	85	81						
242	23		B	67.3	143	83	92						
243	23		E	66	135	100	100						
244	23		E	67.5	109	70	68						
245	23		E	64	109								
246	23		E	62.4	109								
247	23		E	63.3	110								
248	24		D	62.4	143	80	72						
249	24		E	69.3	116	95	86						

TABLE XXIX—*Concluded*

MENTALLY DEFECTIVE BOYS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
250	25		B	70.4	172	160	130						
251	25		C	62	100	58	50						
252	25		E	66.8	104	42	51						
253	25		E	65.4	118	38	52						
254	25		C	66	125	103	87						
255	26		E	71	173	110	83						
256	26		D	67	144	35	104						
257	27		E	64.8	122	27	43						
258	27		E	70.5	151								
259	28		C	69.4	145	112	118						
260	28		D	67.5	137	106	112						
261	28		C	64.5	124	95	120						
262	28		E	67.6	170	22	26						
263	28		E	65.9	130	66	60						
264	29		D	61.8	100	75	para						
265	29		E	65.4	109	71	65						
266	29		D	67.3	154	120	110						
267	29		D	64.3	137	60	58						
268	29		B	70.9	176	61	68						
269	30		D	62.8	134	80	96						
270	30		D	64.5	127	48	72						
271	30		D	63	209	90	76						
272	30		B	70.1	193	117	115						
273	30		B	71.1	188	120	110						
274	30		B	65.5	158	107	112						
275	31		E	68.5	120	40	58						
276	31		B	66.5	158	110	81						
277	31		B	65.5	138	125	120						
278	32		D	62.8	145	55	42						
279	32		E	67	122	30	20						
280	33		B	64.1	158	116	111						
281	34		E	68	143	52	para						
282	35		E	67	132	55							
283	36		E	65.5	135	47	50						
284	36		B	68.5	192	146	131						
285	37		D	62.3	138	91	95						
286	37		B	70.9	144	110	87						
287	43		E	67.9	150	68	52						
288	48		E	68.3	133								

TABLE XXX

Mentally Defective Boys

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter		Noun	Association	
								1		2		1	2			
	1	2	3	1	2	R	L.	Amt.	Touch	Amt.	Touch	A's	B's		R.	W.
1	96	92	128	97.8	98											
2	100	100	90	97.4	98.4											
3	84	82		98.2	98.6											
4	120	92	126	98.6	98.6											
5	76	88		98.8	98.6	24.5	26									
7	84	84		98.4	99.2	26	30									
8	92	92		98.6	98.4	23	23.5									
9	94	111	90	99.2	99.2	24	23.5									
10	90	92		99	98.8	23	24.8	9	14	7	10	6	16	11	2	2
11	92	96	94	97.6	99.8	30	25							1	F	
12	80	88		98.8	99.2	26.5	22.5									
13	90	84		98.8	99.4	31	29									
14	60	78	88	98	99.4	27	27.5									
15	82	80		98	98.6	24	25									
16	86	86		97.2	98.6	24	24									
17	114	108	112	99	99											
18	90	94	102	98.6	99.2	26	27	13	60	15	94	8	8			
19	132	120	120													
20	80	96	96	98.8	97.8											
21	84	88		98.4	98.6											
24	98	98	92	99	98.8											
25	80	80		98.8	98.8											
26	86	86		99	100.6	26.3	24.5									
27	116	112	122	98.4	98.4											
28	84	84		98	98.4	27.8	26.3									
29	84	80		98.6	98.8	27	24.5									
30	80	88		99	99	26	26.5	11	25	23	117	19	24			
31	90	80		99	99	20	27.8	5	8	12	23	10	14			
32	98	76	94		99	25.5	27.8	11	15	13	41	6	25	0	4	2
33	70	74	79	98.2	98	27.8	26.5	17	42	26	108	11	11	11	20	
34	76	78		98.8	98.8	25.3	23	15	34	17	51	12	14	7	3	
38	74	76		97.8	98.2											
39	96	86	92	99.8	99.8	21.5	29.5	18	83	30x	184	25	25			
41	84	100	100	98.4	99.4	26.8	18.5	16	85	19	121	4	13			
42	78	76		99.4	99	23.5	26	17	38	30x	140	20	21			
43	100	94	90	98.2	98.6	29.5	24	19	92	14	60	15	14	3	F	
44	98	78	78	99	98.6	24	25	17	69	27	116	15	17			
45	95	96	78	97	99	24.5	25	12	5	8	3	24	24	11	18	2
46	80	62	72	99	98.2	28.8	26.5	14	33	16	54	12	14	5	17	2
47				98.4		29	27.8	13	75	20	150	F	F	2		
48	92	100	92	98.6	97.6	29	28	19	62	30x	139	15	17	11	18	2
49	86	84		99	98.6	25.8	23	19	72	30x	185	16	21	8	6	
50	68	96	92	97.6	97.4	23.5	27.8	12	21	19	60	16	14	11	19	
62	80	76		98.2	99	26.8	25	18	17	27	65	29	33	11	20	
63	72	90		98.8	98.6											

TABLE XXX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter			Association	
								1		2						
	1	2	3	1	2	R	L.	Amt.	Touch	Amt.	Touch	1 A's	2 B's	Noun	R.	W.
64	84	82		99.2	99.2	26	26	9	25	9	12	8	18			
65	96	92	82	97.6	98.8	24	25.5	22	109	27	151	21	23			
66	72	72		98.2	98.6	27	30.8	11	53	14	86	8	6	F	F	
67	76	86		98.2	98.4	26	27	9	12	11	11	20	32	6	17	3
68	79	82		98.6	99	29	31.5	14	72	24	15	6	10	1		
69	80	94	90	99	99	27	24.8	10	20	15	45	14	19	9	9	2
70	94	96	88	98.8	99.4	24	23	12	57	16	88	6	18			
71	74	72		97.2	98.4	27.5	29	18	64	28	99	23	18	0	6	3
72	90	82		100.2	99.8	26.3	24.3	8	17	14	55	11	14	0	F	
73	96	84	105	98.6	99.6	32.5	32									
74	84	84		98.4	99	23	27	7	8	8	20	6	7			
75	88	92		99.2	99.2	23.5	23.5	14	36	23	79	10	15			
76	86	106	94	98.2	98.6											
77	82	96	92	97.2	98.2			11	55	6	19					
78	114	90	100	96.4	98.2											
80						14	19.8									
81	76	80		98.8	98.4											
82	112	92	100	99.2	98.6											
83	86	82		98	98											
84	87	86		98.8	98.6	30.5	29.5	12	29	12	19	3	9			
85	72	72		98.4	99.4	26.3	27.3	15	34	13	27	20	31	8	5	4
86	74	70	82	101.8		31	29	26	158	30x	166	10	24	4	F	
87	80	84		98.6	97.6	26	28	21	68	30x	138	20	25	7	17	
88	87	90		97.6	98.6	27	26.5	8	8	10	18	18	28	5	11	2
90	88	84		97.6	98	24	26	10	16	16	50	16	24	7	16	
91	74	78				28.5	28					3	9			
93	78	98	80	98.4	97.8	25	19.5	28	170	30x	186	34	29	9	19	1
94	80	70		97.8	96.6	27.8	24.8	30x	108	30x	93	43	41	11	19	1
96	80			98.2		28	31									
98	90			98.6		30	30									
99	78	90		98.2	98.4	26	25	12	16	12	18	11	19	3	6	
100	84	84		98.8	98.6	26	26	8	14	13	33	13	19			
101	80	78		98.6	98.8	28.5	28	21	84	23	82	10	30	3	9	2
102	94	80	72	98.6	98.2	27	24.8	10	37	7	6	5	9	1	3	
103	92	86		99	98.6	26.5	25	18	100	17	88	14	17	0	F	
104	78	80		97	98	26	25.5	14	22	12	14	24	43	7	12	
105	90	90		99.2	99.8	24.5	24	19	84	30x	183	19	39	8	19	1
106	66	86	92	98.8	97.6	23.5	26.5	7	8	11	36	27	38	7	10	1
107	78	82		99	99	28	22.5	23	137	23	124	10	14	3	F	
108	86	96	96			26	27	11	38	11	47	9	11	0	F	
109				98.2	98.2											
110	92	90		98.4	98.2											
111	96	94	78	97.2	96.2	26	26.5	19	65	24	100	24	48	7	8	3
112	78	76		98	98.4	25.3	25	11	1	20	19	33	33	11	19	1
113	86	86		98.6	98.6	28.5	25.8	11	0	14	5	27	50	10	20	
114	84	84		97.8	98.8	25.5	25	4	0	12	11	30	20	11	19	1

TABLE XXX—*Continued*

MENTALLY DEFECTIVE BOYS

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter		Noun	Association	
								1		2						
	1	2	3	1	2	R	L.	Amt.	Touch	Amt.	Touch	1 A's	2 B's		R.	W.
115	54	56	58	99	98.8	25	26	13	4	17	10	26	29	8	20	
120	104	90	88	98.6	98.6	29	30									
121	104	100	96	97.6	98.8	24	26.5	F		19	116	F		0	F	
122	74	78		98.2	99.4	26.8	27	13	48	20	86	12	16	0	F	
123	92	76		97	97.6	27.5	28	11	58	12	62	8	7	0	F	
124	82	82		98.6	98.6	26	26.5	22	121	22	105	25	28	5	10	
125	88	92		98.2	98	27	25.5	9	8	13	24	13	29	8	14	2
126	78	88		97	98.2	28.5	26	8	4	11	21	12	22	10	16	
127	94	84	82	98.4	98.6	24	25	11	20	16	59	16	15	7	14	1
128	86	94	86	98.6	98.6	27.3	26.5	6	1	4	0	21	34	10	12	
129	84	84		99.8	99.6	23	28	16	78	14	64	22	16	0	2	1
130	84	80		98	98.2	28.3	27	30x	164	30x	180	27	28	10	19	1
131	78	80		97.6	98	28.5	28	7	41	14	82	6	15	F	F	
132	90	80		98.6	98	24.5	26	9	30	11	35	20	22	3	10	6
133	84	94	94	98.6	98.2	28.5	28.5	18	83	24	82	30	18	10	20	
134	70	68	82	98.4	98.6	24	25	15	29	17	32	21	15	10	20	
135	78	70	62	98.6	98.6	26.8	24	22	47	30x	84	35	29	11	19	1
136	86	86		98.4	98.8	28.3	26.3	15	77	20	107	14	15	10	18	2
137	62	60	54	98.4	98.8	24.3	25	12	7	19	14	39	48	10	19	1
145	72	72		99.6	100.2	25	26.5	11	65	17	114	12	11	0	F	
146	98	86	87	99.4	99.2	26	26	12	102	16	127	11	24	10	12	
147	64	64	70	97.6	96.8	24.3	26.5	10	10	17	38	12	43	8	8	
148	78	74		98.2	98.2	24.5	23.5	3	3	5	0	F	13	3		
149	74	80		97.8	97.8	26.5	26	20	65	30x	150	33	40	1	16	4
152	72	80		97.2	97.2	27	24.5	14	75	16	79	18	23	F	F	
153	80	66	86	98.4	98	27.5	24.3	8	2	9	3	22	35	4	3	2
154	86	84		98.2	97.6	27.5	26.8	8	28	11	29	31	40	5	4	4
155	94	96	106	98.6	98.4	27	28	18	51	20	64	21	25	1	5	3
156	72	70	68	98.6	98.8	24	25.8	11	29	11	15	17	30	6	11	6
157				98.4	99	25	25.5	14	30	24	121	32	24	4	1	
159	80	78		98	98.2	21	26	30x	229	30x	179	19	26	10	18	
160	90	90				27.5	27.8							10		
161	78	72		98.4	98.8	26	26	9	0	29	35	35	49	11	18	2
162	80	76		98.4	98.4	25.5	24.5	11	1	19	17	40	52	10	18	2
165	78			98.6		27	28									
166	100					26.3	25.5									
167	90			98.2		26	24.5									
168	108	88	94	98.6	98.6	26	25	9	1	13	6	38	38	6	6	1
169	84	72		99	98.4	29.5	28.5	7	18	12	38	21	24	6	4	16
170	70	64	96	98.8	98.6	23.3	25.5	3	3	12	29	15	19	9	13	2
171	88	82		99	99.2	22.5	26.3	7	6	5	1			10	18	
172	96	90	90	97.8	98.4	25.5	25.5	30x	198	29	145	22	37	0	F	
173	74	72		97.6	98	25	27	12	4	22	17	51	55	8	20	
174	78	80		98.8	98.6	25	27.3	19	23	30x	66	47	55	10	20	
175	88	90		98.6	98.8	24.5	26.8	7	3	7	1	18	19	10	20	
184	88	62	94		98	29	25	10	25	18	67	18	22	6	6	1

TABLE XXX—*Concluded*

MENTALLY DEFECTIVE BOYS

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter		Noun	Association	
								1		2						
	1	2	3	1	2	R	L.	Amt.	Touch	Amt.	Touch	1 A's	2 B's		R.	W.
185	96	88	90	98.8	97.6	24	27	29	79	30x	118	50	45	3	7	1
186	80	84		98.4	97.4	29	27	17	79	25	119	19	23	5	5	2
189	74	84		97.8	98.6	28	27.5	4	3	12	25	40	39	11	19	1
190					98.2	23	25.5	6	1	11	6	31	36	10		
194	88			99		30	30									
195	54	62	58	98.6	98	28	27	12	11	23	77	25	48	5	17	3
202	68	74	72	98.4	98.4	28.5	26.8	12	12	18	57	18	17	6	18	2
203						23.3	24	7	0	19	13	39	38	10		

TABLE XXXI

MENTALLY DEFECTIVE GIRLS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
301	8	1	C	51.9	66	15	14	3		4	4	3–2	1–2
302	8	9	B	49	52	17	17	1	2	2	6	2–2	1–2
303	8	6	E	45	50								
304	8	9	E	51	68								
305	8	10	E	42.3	43								
306	9	5	A	52.5	62	18	18	1	3	3	4	2	4
307	9	10	B	52.4	70	17	18	1	2	3	7	3	3
308	9	7	C	49	49	8	8	2	1	4–1	3–1	5	1–1
309	9	11	B	47.5	47	19	12	3		4	5	3	1–2
310	9	9	C	49.4	75	17	17	3					
311	9	10	C	54.9	63	17	18	3					
312	9	4	E	50.3	57								
313	9	8	E	44.9	61								
314	10	6	C	54	67	16	20	3					
315	10	8	C	55.3	81	32	31	3		5	5	2	2
316	10	8	C	50.1	67	18	para	3		5	3–1	3–1	4–1
317	10	2	C	56	73	43	37	3		4	5	3	5
318	10	6	C	53		20	5	2					
319	10	5	A	50.3	61	18	20	3		5	5–1	4–2	4
320	10		A	50.9	59	28	30	3		4	4	3	6
321	10	1	E	55.6	78								
322	11	3	A	57.1	91	30	28	3		6	7–1	4–1	4–1
323	11	8	B	54.8	60	23	24	3		4	4–2	4–2	3–1
324	11	11	B	55.3	92	44	45	1	2	6	6	4–1	3–1

TABLE XXXI—*Continued*

MENTALLY DEFECTIVE GIRLS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
325	11	9	B	51.4	54	12	12	3		4	6	6	3
326	11	8	A	55.1	73	31	30	3		5	7	4–1	2–2
327	11	8	B	53	74	27	30	3		7–1	6	7	6
328	11	3	C	56.5	79	23	22	3					
329	12	8	C		96	47	50	1		3–3	5		
330	12	1	B	53.4	70	16	17	3		7	6	5	7–1
331	12	11	A	53.1	77	34	27	3		4	5	5	4
332	12	5	A	50	65	23	21	3		6	5	5–2	5–1
333	12	7	A	60.9	93	46	38	3		4–1	7	4–1	4–1
334	12	8	B	58.4	80	44	42	2	1	5	7	4–1	5–1
335	12	9	C	55.9	69	33	22	3		4	5–1	5	1–3
336	12	11	C	51.1	63	10	5		2	1	1–2	2–1	2
337	12	10	B	52.1	64	18	12	3	1	6–1	5–2	3–1	3–1
338	12	4	C	52.8	71	18	21	1	2	3–2	2	3	0–2
339	12	10	B	55.6	74	32	31	1	2	5	5	3–1	4
340	12	0	E	58.8	90								
341	12	9	E	57.6	72								
342	13	3	C	57	79	18	18	3		4	4	2	2
343	13	3	C	57.3	93	42	32	3		6	6	5	6–1
344	13	9	C	58.9	93	51	51	3		1	3	3–1	1–2
345	13	9	B	54	69	22	26	3		5	3–1	5–1	5
346	13	5	B	52	61	30	22	2		6	5	3–4	4–2
347	13	8	C	59.3		42	38	3					
348	13	0	C	50.9	64	17	17	3					
349	13	0	C	61.4	113	49	50	3					
350	13	8	E	53.1	84								
351	14		B	61.4	110	52	48	3		7–1	6	5	6
352	14	1	B	58.1	81	42	33	3		5	4	5	4–1
353	14	3	B	59	94	54	57	3		4–2	6	5	2
354	14	3	B	61.8	99	48	44	3		6–1	6	6–1	4–2
355	14	11	B	63	118	43	33	3		5	5	4–2	4–1
356	14	1	B	56.9	84	47	35	3		5–1	6	5–1	4
357	14	1	A	56.6	94	33	34	3		5	7	7–1	4
358	14	6	A	58.9	85	51	43	3		4–1	5–1	6	7–1
359	14	8	A	62.1	91	56	49	3		9	7	6–2	5–3
360	14	8	A	63.9	128	78	70	3					
361	14	2	A	62.1	98	60	62	3				8–1	7
362	14	1	C	56.9	105	60	72	3		4–1	6–1	6–1	4–1
363	14		B	56.8	82	38	32	3		6	6	5–1	5–3
364	14	11	C	61.3	121	47	48	3		7	6	6	5–1
365	14	5	B	63.1	123	72	71		3	4	4–1	5–1	5
366	14	1	E	58.6	94								
367	14	5	E	57.3	76								

TABLE XXXI—*Continued*

MENTALLY DEFECTIVE GIRLS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
368	15	0	B	58	96	53	34	3		4	5	5	2
369	15	2	B	57.3	99	63	54	3		7	8	7–1	5
370	15		B	58.6	96	57	58	3		7	7	6	6
371	15	3	A	58.4	84	66	49	3		7	4	4–2	3–1
372	15	11	A	67.9	172	60	61	3		8–1	8–1	8	10–1
373	15	6	B	65	112	77	62	3		6–5	8–2	2–3	6–1
374	15	10	C	63.9	109	69	77	3		4	6–1	6–1	6
375	15	10	B	62.9	116	67	54	3		4–1	6	5	4
376	15	7	C	57.6	89	32	33	3					
377	16	0	B	65.5	142	73	78	3		7–3	6–2	4–5	4–1
378	16	10	C	58.9	110	40	38	3		5–1	5–1	5	4
379	16		B	61.5	106	60	51	3					
380	16		B	61.4	97	68	62	3		5	9	6–1	5–3
381	16		B	59.4	119	44	49		3	7	8–1	6	8
382	16		B	63.9	114	70	65	3		9–2	8–2	6–1	3–3
383	16	5	B	57.9	110	67	55	3		5	4	6	4
384	16	4	A	62.3	109	70	62	3		6	5	6–1	3–3
385	16	7	A	65.3	137	104	98	3		9	7–1	7–2	7–2
386	16	11	B	58.4	188	67	61	2	1				
387	16	7	B	58.6	104	46	41	3		6	6	5–1	
388	16	11	C	56.3	87	45	45	3		3	3	2–2	2
389	16	10	C	57.8	97	25	24	1					
390	16	7	B	57.5	95	44	45	3		6–2	3–5	3–2	3–5
391*	16		D	37.8	40			3					
392	17	5	B	64.3	151	60	50	3		8	6–1	4–3	3–3
393	17	11	B	63.8	117	36	43		3	5	7	6–1	5–1
394	17	6	B	58.9	118	73	70	3		5	7	4	5
395	17		B	60.5	113	78	73	3					
396	17	4	C	59.5	142	41	44	3		4	5	5–4	5–1
397	17	8	B	58.4	121	27	25	3		5	6	5	5
398	17		A	60.8	103	76	68	3		4	4	6–1	5
399	17	6	B	59.9	116	50	45	2	1	7	6	8	4–1
400	17	2	A	61.5	117	69	57	3		8	7–1	7	8–1
401	17	2	A	64.6	107	68	48	3		6–1	9	6	9–1
402	17	11	A	66.1	141	91	72	3		8	9–1	6–1	6–4
403	17	9	C	58.5	91	20	26	1	2	4–1	3	4–1	4–1
404	17	10	B	59.9	101	61	39	3		3	5	3–2	2–2
405	17	6	B	60.3	129	58	50		3	5–1	7–1	4–4	3–7

*Number 391 is a cretin dwarf—not counted.

TABLE XXXI—*Concluded*

MENTALLY DEFECTIVE GIRLS

Individual	Age		Grade	Height Inches	Weight Pounds	Grip Pounds		Handed		Memory Word			
										Related		Unrelated	
	Yrs.	Mo.				R.H.	L.H.	R.	L.	A R-W	B R-W	A R-W	B R-W
406	18		C	62	114	41	37	3		4	5–1	7	6
407	18	1	C	59	94	51	42		3	2	5	5–1	3
408	18	8	C	62.4	124	73	67	1	2				
409	18	9	B	62.8	148	78	61	3		8	6	5–2	6–1
410	18	8	B	58.9	119	62	50	3		5	6	8	3
411	18	4	A	63.1	109	68	60	3		5	7	7	7
412	18		A	60.8	116	81	62	3		8	9–1	5–5	6–4
413	18	2	B	65.1	119	57	64	3		5	8	7–5	5
414	18	6	B	66.8	116	45	44	3		8–3	7–1	6–2	6–2
415	18	0	C	67.5	164	62	62	3		5–1	5–2	4–4	5–2
416	18	4	C	60	113	83	63	3					
417	19	4	B	64	138	80	68	3		4–1	7	3–4	5–2
418	19	0	B	64.5	183	95	80	3		6	7	8	4
419	19	0	B	58.8	130	51	67	3		6–1	5–2	7–1	5
420	19		B	63.5	162	111	115	3		6	5	5	6–1
421	19	4	B	58.9	103	25	26	3		5	6	7	4
422	19	4	C	62.1	106	51	43	3					
423	20		C	50.5	57	10	14	2	1				
424	20		C	63.6	119	45	42	3		5	6–1	5	6–1
425	20	3	B	58.8	98	48	48	3		5	4–1	5–2	5–1
426	20	2	A	62.3	154	72	63	3		7	7	6–1	8
427	20	2	A	67	126	83	70	3		9	7	5–3	5–4
428	20		A	62.1	96	77	61	3		8–1	8–1	10	9–1
429	20		B	61.4	112	40	42	3		7	5–1	5	7
430	20		A	65.8	130	71	61	3		9	8–1	8	8–2
431	20	2	B	61.9	146	52	65	3		6–1	7	4–2	6–1
432	20		B	61.5	115	46	50	3		7	8–1	5	3–4
433	20	9	B	60.9	100	57	52	3		7–1	7		
434	20	9	A	63.5	123	70	61	3		9	9	8–1	9
435	20	3	C	54.4	96	23	24	3					
436	21		C	61.6	98	57	66	1	3	5	6–1	3	4
437	21		B	58.3	99	43	41		3	5	5	6	4–1
438	21	11	A	65.8	124	97	78	3		8	7–1	7–1	8–2
439	21	11	A	56.8	118	54	43	3		7–1	10	6	5–1
440	22		A	58.6	114	54	57	3		8	9	7–2	8
441	23	2	A	63.3	108	58	62	3		6	7–1	5	6–4

TABLE XXXII

Mentally Defective Girls

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter		Noun	Association	
								1		2						
	1	2	3	1	2	R	L	Amt.	Touch	Amt.	Touch	1 A's	2 B's		R.	W.
301	72	72	70	97.2	98	29	26.5									
302	96	86	90	98.6	98	23.3	23.8									
306	98	88	90	98.6	98.6	23.5	22.5	6	26	24	133	16	14			
307	120	128	120	99	99.4	26	26.5	9	19	17	67	7	15			
308				99.6	98.4			5	12	5	16	F	F			
309				98	101.2			6	23	14	74	14	17			
314				97.6	96.2			F		F		F	F			
315				97.6	98.4			26	135	30x	175	18	21			
316				98.8	98.6			12	91	14	92	F	F			
317				98.6	99.2			1	0	2	5	F	F			
319	102	86	84	98.8	99.4	27.3	28.5	9	9	11	14	24	18			
320	98	90	96	98.6	98.6	24	23.5	18	48	21	43	21	20			
322	90	86		96.8	97.4	24.8	24	19	29	10	8	39	26	10	20	
323				97.6	97.8			20	95	27	14	25	24			
324	106	92	92	97.4	98.4	25.5	24	6	6	11	40	24		3	8	2
325	106	106	104	97.4	98	24.5	25	3	6	5	12	20	20	2	6	2
326	84	90		98.8	99	26	27	11	14	16	38	28	15	11	13	
327	86	84		97.4	98.4	24	27	8	20	11	47	48	52	5	5	1
329						23	27	4	10	6	26	F	15	3		
330	72	82		98.8	98.6	25	26	17	88	25	157	37	37	6	9	8
331	86	84		97.6	98.8	24	24.8	11	31	20	72	36	26	9	11	1
332	78	96	110	98.4	98.6	26.3	23	11	7	19	26	41	31	6	20	
333	88	86		98.6	98.8	24.5	25	19	55	30x	132	57	39	5	7	3
334	70	68	72	98.2	98	26.5	25.5					39	33	5	4	
335				99	99.6			6	8	19	99	21	10			
337				98	98.4			26	133	30x	142	26	33			
338	118	108	114	98	98.4	29.5	23									
339	100	100	104	97	97.2	28	25									
342				96.6	98			3	9	5	19	F	14			
343				98.4	97.6			4	21	7	41	F	15			
344				97.8	99.2			18	62	20	73	19	20			
345	94	100	86	99.6	99.4	26	27							5	4	1
346	96	94	104	98	98.6	25.8	31	4	6	5	2			6	9	6
347	86	94	90	97.8	98.4	25	25.8									
351	62	64	62	96.4	97.8	28	26.5	15	46	30x	150	25	31	4	4	
352	88	98	116	98.6	99.6	26	25	21	85	23	118	31	24	6	14	3
353	74	72		98.2	98.4	25	29.5	11	15	21	69	34	43	3	12	2
354	66	76	78	96.6	98.4	21	24.5	12	39	20	102	37	30	7	9	
355	72	88		97.8	98	25	27.3	4	0	7	5	35	35	11	10	1
356	92	84		96.8	97.2	22	26	4	0	7	5	33	29	5	14	1

TABLE XXXII—*Continued*

MENTALLY DEFECTIVE GIRLS

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter		Noun	Association	
								1		2						
	1	2	3	1	2	R	L.	Amt.	Touch	Amt.	Touch	1 A's	2 B's		R.	W.
357	96	104	110	98	98.8	24	23.3	25	83	14	29	38	36	11	20	
358	108	120	110	98.8	98.6	22	26.3	7	0	4	1	34	33	11	17	3
359						25	26.5	3	0	4	0	29	29	10	19	
360						24	23	11	5	9	1	38	34			
361						25.3	25.3								20	
362	80	84		99.2	98.6	31.5	29	2	7	2	11			F	F	
363	98	98		100	98.8	25.5	25	16	37	22	82	28	27	4	5	2
364	80	80		98.2	98.2	28	29	12	24	16	37	16	20	6	F	
365	66	66	66	97.6	97.2	26	23.8	30x	97	30x	134	32	40	8	2	2
368	94	112		96.2	100	22.3	25							7	15	
369	96	78	76	98.6	99	26.5	26.5	4	0	7	0	39	31	11	9	
370	104	94	106	97.2	98.2	24	25.5	12	40	25	141		4	5	3	1
371	90	96	90	97	98.2	21	20.5	11	13	11	16	30	22	9	17	2
372						26.5	27	13	7	12	2	40	42	11	20	
373	72	78		98	97.6	25	24.5	12	21	13	25	11	F	2	2	1
374	102	102	90	98.8	99	25.8	25.5	11	36	14	47	15	10	4	F	
375	88	90		97.6	97.6	31.5	27	11	31	13	27	19	15	8	11	1
377	86	80		97.4	97.8	27	27.3	17	20	30x	77	35	49	3	4	5
378	66	60	60	98.2	97.6	27	25	12	43	18	100	25	23	4	2	
379				98.4				6								
380	78	76		97.6	98.4	23	26		1	29	68	47	34	4	4	3
381	72	72		98	98.2	21	26.8	16	45	25	125	30	21	6	13	7
382	80	82		98.2	98	23	28.8	11	12	24	70	55	51	5	13	1
383	80	80		97.8	98.4	24	23	11	9	7	0	23	17	10	8	1
384	76	76		98.6	98.6	23	24.5	22	23	11	3	44	45	11	20	
385						22	24	4	0	10	0	32	33	8	16	4
386						27.5	23.5									
387	70	72	74	98.2	98.2	25.8	28	6	13	9	39	10	11	0	F	
388	64	64	72	97.8	98	31	27	4	4	7	19	18	12	1	F	
389					98	F	F	F		F						
390	88	94	100	96.4	97.2	27.8	26.8	9	29	17	80	20	19	7	19	1
391				99.4	99					F			F			
392	76	78		97.2	97.2	27	28.8	9	19	26	88			2	3	1
393	66	68	66	98	98.4	29	27	16	45	23	83	23	25	11	11	
394	72	78		98.2	96.8	29.5	26	24	40	29	80	42	40	9	4	1
396	74	64	64	98.8	98.4	23.5	21.8			15	69	22	27	2	3	1
397	82	78		98.2	98.6	24.5	25.5	3	17	11	72	11	10	4	12	5
398	82	82		98.2	98.6	21	24	14	2	9	0	43	40	7	10	2
399	108	108	92	99.6	99.2	24.5	25	10	8	15	21	30	38	11	17	3
400						21	27	9	3	11	6	42	43	10	19	
401						25	27	30x	85	30x	78	51	50	11	19	1
402						23	26	3	0	4	0	60	47	11	20	
403	98	90	86	98.8	97.6	28	31.5	1	0	2	8		3	1	F	

TABLE XXXII—*Concluded*

MENTALLY DEFECTIVE GIRLS

Individual	Pulse			Temperature		Muscular Memory		Maze				Perception Letter		Noun	Association	
								1		2						
	1	2	3	1	2	R	L.	Amt.	Touch	Amt.	Touch	1 A's	2 B's		R.	W.
404	72	72		98	98	25.5	25.8	6	9	9	25	21	38	2	3	1
405	86	86		98	98.2	26	28	29	127	30x	134	29	46	10	10	
406	78	90		97	97.6	30	26.5	9	23	15	51	20	21	3	F	
407	96	90	86	97	97.2	34	21	8	38	12	51	17	24	5	F	
408						25	23	11	40	11	48	33	31			
409	72	82		97.8	98.6	25.5	29	9	11	7	1	27	32	8	13	
410	86	84		98	98.2	27.5	25.5	11	29	4	5	20	25	0	14	4
411						28.5	26.5	10	12	12	21	15	15	10	19	1
412						26	27	10	6	13	18	30	24	11	20	
413	74	72		99	98.4	21.5	30					36	48	5	7	1
414	90	102	100	98	97.6	27	26	12	17	21	68	35	32	9	16	1
415	58	62	72	97	97.8	29	26	7	9	12	69	22	16	5	F	
417	68	72	70	97.6	97.6	26	26	25	79	12	19	24	35	5	4	3
418	100	102	98	98.4	99	23	25.3	11	18	15	35	29	41	10	19	
419	74	68	70	98.8	98	26	27	10	17	10	16	19	19	8	14	1
420	88	78		98.8	98.6	25	24.8	14	7	9	1	42	44	10	12	
421					97.2	23.5	27.5	9	11	8	13	49	46	11	15	
423				98.6	99.4			7	1	13	10	F	21			
424	70	60	64	98	98	27.5	30	19	73	22	99	22	42	3	4	2
425	68	80	74	98.8	98.8	24	25	6	0	5	0	20	34	11	8	1
426	76	78		97.6	97.8	24.8	23.8	13	12	9	8	42	38	9	17	1
427						26	25	15	13	20	24	49	49	8	16	4
428						26	26.5	3	0	7	0	42	42	8	20	
429	100	124		98.8	98.6	24	29.3	15	39	13	29	14	16	11	10	
430						24.5	24	7	0	22	20	38	53	11	20	
431	70	74	74	97.4	98.8	27.5	25	28	98	30x	103	19	23	5	15	5
432	76	70	76	97.6	98.8	27	25	14	7	20	28	22	37	8	19	1
433				98.2		25	27	25	97	25	102	42	30	3		
434						24	25	8	0	8	0	50	65	11	20	
436	76	74		96.8	97.8	28.5	26	13	15	12	10	35	27	1	F	
437	88	100	90	97	98.8	24.5	23	9	8	20	53	30	33	5	8	
438						25.5	26	8	0	10	0	45	53	11	16	2
439						26	25	5	8	7	10	22	27	11	20	
440						23	24	8	0	12	1	45	52	11	19	1
441						30	24.5	15	6	12	1	34	48	11	19	

TABLE XXXIII

NORMAL BOYS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
501	6	6	1	44.3	42	7	8		1
502	6	9	1	48.8	56	17	20	1	
503	6	11	1	46.8	46	19	12	1	
504	6	10	1	45.5	42.5	17	28	1	
505	6	10	1	50.6	58	28	23	1	
506	6	10	1	51.5	59	28	25	1	
507	6	9	2	47.1	46	21	18	1	
508	6	6	1	46	43.5	15	13	1	
509	7	1	1	48.8	52	20	18	1	
510	7	7	1	48.8	50	20	17	1	
511	7	7	1	47.5	46	19	25	1	
512	7	11	1	49.4	55	23	22	1	
513	7	3	1	49.8	56	23	25	1	
514	7	1	1	46.3	45	17	19	1	
515	7	3	1	46.8	46	9	8	1	
516	7	3	1	46	48	13	15	1	
517	7	9	2	52.5	66	44	34	1	
518	7	7	2	50.6	59	28	32	1	
519	7	11	2	47.8	53	26	22	1	
520	7	10	3	50	51	28	23	1	
521	7	10	3	49.9	52.5	19	21	1	
522	7	11	4	52	60	30	25	1	
523	8	3	1	48	51	18	20	1	
524	8	6	1	49	54	30	32	1	
525	8	0	1	49.1	54	23	22	1	
526	8	6	2	53.6	67	43	29	1	
527	8	7	2	50.4	54	24	18	1	
528	8	0	2	50.8	54	23	24	1	
529	8	11	2	51	60	27	32		1
530	8	9	2	51	64	28	23	1	
531	8	4	2	50.6	59	32	33	1	
532	8	0	2	46.9	45	23	22	1	
533	8	0	2	51.8	62	38	32	1	
534	8	11	2	50.9	54	23	24	1	
535	8	8	2	50.1	57	25	25	1	
536	8	11	2	52.1	58.5	38	35	1	
537	8	5	2	53.4	62.5	34	35	1	
538	8	2	2	48	47	20	17	1	
539	8	7	3	48.5	59	34	28	1	
540	8	9	3	52	59	35	30	1	
541	8	11	3	54.1	62.3	28	26	1	
542	8	2	3	48.9	49	20	16	1	
543	8	8	3	49.8	59	36	37	1	
544	8	10	3	46	43	10	11	1	
545	8	6	3	51.9	66	32	30	1	
546	8	9	3	50.6	61.5	22	18	1	
547	8	10	3	51.5	60	34	32	1	
548	8	5	3	52.3	58.5	26	25	1	
549	8	3	4	53	71	38	38	1	

TABLE XXXIII—*Continued*

NORMAL BOYS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
550	8	1	4	49.3	49	22	21	1	
551	8	9	4	49.1	58	27	23	1	
552	8	10	4	57.6	66	40	44	1	
553	8	5	4	53	64.5	31	31	1	
554	8	7	4	56	68.5	38	41	1	
555	9	11	1	52.6	57	38	39	1	
556	9	4	2	45.3	42	20	20		1
557	9	1	2	48.4	49	30	20	1	
558	9	0	2	49.9	57	25	22		1
559	9	0	2	49.5	45.5	27	23	1	
560	9	5	3	50.5	54	25	22	1	
561	9	7	3	53.1	61	28	29	1	
562	9	5	3	52.1	64.5	28	24	1	
563	9	5	3	52.9	62	38	34	1	
564	9	9	3	57	75.8	43	35	1	
565	9	6	3	57.3	69.5	47	42	1	
566	9	4	3	57.1	76	43	41		1
567	9	10	3	58.3	77	47	43	1	
568	9	0	3	53.1	62	30	30	1	
569	9	4	3	50.5	54.5	25	28		1
570	9	4	3	51.5	60.5	32	32		1
571	9	7	3	51	55	30	25		1
572	9	9	3	51.5	59.5	40	29	1	
573	9	1	3	54.5	96	55	43	1	
574	9	3	4	56.8	66	42	39	1	
575	9	4	4	50.3	52	28	25	1	
576	9	9	4	52.3	51	24	15	1	
577	9	0	4	53.3	50	32	22	1	
578	9	8	4	52.6	68.5	39	30	1	
579	9	6	5	53.8	69	40	37	1	
580	9	1	5	50.9	64	38	41	1	
581	9	9	5	51.8	59	30	26	1	
582	9	11	5	54	59	34	38	1	
583	9	3	5	55.6	64	40	35	1	
584	10	0	1	56.9	72	34	31	1	
585	10	5	2	50.5	55	30	30	1	
586	10	7	3	52.8	58	27	28	1	
587	10	4	3	53.8	70.3	41	40	1	
588	10	0	3	56.9	88.5	58	58	1	
589	10	9	3	51.4	51	para			
590	10	4	3	49.5	52	34	35	1	
591	10	8	4	53.1	63.5	32	27	1	
592	10	4	4	52.9	66.5	38	31	1	
593	10	0	4	54.3	65.5	28	20	1	
594	10	3	4	56	84.5	57	54	1	
595	10	9	5	50.9	61	33	28	1	
596	10	8	5	54	66	28	30	1	
597	10	9	5	53.3	68	37	37	1	
598	10	10	5	55.3	73	44	42	1	

TABLE XXXIII—*Continued*

NORMAL BOYS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
599	10	8	5	55.5	71	40	37	1	
600	10	8	5	59.9	78.5	57	47	1	
601	10	11	6	57.9	89	57	42	1	
602	11	2	2	50.1	63	30	29	1	
603	11	10	2	59.3	114	43	40	1	
604	11	8	3	56.3	77	31	32	1	
605	11	0	4	53.3	65.5	50	54	1	
606	11	0	4	55.5	95	60	43	1	
607	11	4	5	50.3	54	32	33	1	
608	11	0	5	52.9	65	34	30	1	
609	11	5	5	55	72	42	38	1	
610	11	4	5	55	70	42	31	1	
611	11	10	5	56.5	80	41	40	1	
612	11	4	5	59.9	95	60	61	1	
613	11	5	5	54	59	38	34		1
614	11	2	6	55.5	62.5	38	35	1	
615	11	5	6	55.9	71.5	53	53	1	
616	11	9	6	58.9	77	68	58	1	
617	11	3	6	55.8	70.5	44	32	1	
618	11	7	6	55.6	71	41	42	1	
619	11	10	6	61	89	56	55	1	
620	11	6	6	63	99	78	73	1	
621	12	0	3	60	79	45	44	1	
622	12	1	4	57.1	79	45	43	1	
623	12	2	5	54	63	33	31	1	
624	12	0	5	54.8	69	43	41	1	
625	12	9	5	55.8	79	43	45	1	
626	12	3	5	56.8	68	42	33	1	
627	12	9	5	60.5	94	70	58	1	
628	12	8	5	57.9	98	83	72	1	
629	12	7	5	58	85	55	44	1	
630	12	10	6	54.6	73	50	43	1	
631	12	2	6	58.4	88.5	62	63	1	
632	12	9	6	55.8	71.3	38	33	1	
633	12	6	6	54	66	30	32	1	
634	12	1	6	56.3	71	40	40	1	
635	12	6	6	59.9	90	64	66	1	
636	12	6	6	61	103.5	69	64	1	
637	12	8	6	64	115	80	68	1	
638	12	11	6	55.5	71	51	44	1	
639	12	6	7	54.5	66	37	45	1	
640	12	6	7	59.5	96	56	51	1	
641	12	3	7	58.4	93	69	62	1	
642	12	7	7	59.4	94	72	70	1	
643	12	8	7	63.5	98.5	62	56	1	
644	12	6	7	60.5	106	55	50	1	
645	13	1	5	56	78	59	55	1	
646	13	0	5	54.1	57	39	33	1	

TABLE XXXIII—*Continued*

NORMAL BOYS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
647	13	0	6	53.5	68.5	33	32	1	
648	13	4	6	60.5	100	53	48	1	
649	13	7	6	57.5	96	50	57	1	
650	13	4	6	58.4	94	63	64	1	
651	13	11	6	67	125	79	64		
652	13	1	7	60.3	89	60	54		
653	13	1	7	59.1	93	49	49	1	
654	13	5	7	59	84	48	43	1	
655	13	4	7	62.9	160	84	80	1	
656	13	10	8	62	91	67	81	1	
657	13	5	9	63	125	86	88	1	
658	13	9	9	57.9	77	43	36	1	
659	14	10	3	60.3	109.8	74	71	1	
660	14	2	4	57.8	80	50	41	1	
661	14	11	5	56.8	81	57	46	1	
662	14	1	5	66.5	105	81	70	1	
663	14	4	5	66.5	124	96	98	1	
664	14	10	5	66.9	125	94	82	1	
665	14	3	5	60.8	94.5	65	64	1	
666	14	8	5	64	109.5	91	86	1	
667	14	0	5	60.4	86	70	59	1	
668	14	1	6	59.3	89	58	60	1	
669	14	2	6	55.4	74	45	44	1	
670	14	0	6	59.4	80.5	53	51	1	
671	14	2	6	59.8	80	60	56		1
672	14	2	6	68.9	161.5	84	78	1	
673	14	0	6	59.5	88	68	53	1	
674	14	7	6	67.5	113	92	95	1	
675	14	4	6	61.3	99	69	68	1	
676	14	5	7	60	90	62	51	1	
677	14	0	7	63.5	92	76	80	1	
678	14	7	7	65.4	104	64	64	1	
679	14	0	7	60.4	89	68	52	1	
680	14	7	8	59	86.5	48	49	1	
681	14	5	8	63.5	104.5	68	70	1	
682	14	4	9	63.6	106.3	75	52	1	
683	14	7	10	65	117.3	70	62	1	
684	15	5	5	60	79	42	33	1	
685	15	4	5	56.5	59	30	30	1	
686	15	1	6	66.3	112.5	79	80	1	
687	15	3	6	55.3	105.5	102	93	1	
688	15	3	7	64.3	108.5	73	74	1	
689	15	3	7	65	122.5	114	92	1	
690	15	10	7	66.8	121.5			1	
691	15	11	8	60.5	87	65	57	1	
692	15	9	8	60.6	84	66	57	1	
693	15	0	8	69.3	128	91	90	1	
694	15	5	8	65	110	105	84	1	
695	15	4	8	69.3	141.5	102	90	1	

TABLE XXXIII—*Concluded*

NORMAL BOYS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
696	15	3	9	64.9	104	88	78		1
697	15	9	9	65.3	112.3	85	71	1	
698	15	11	9	69.8	137.3	99	90	1	
699	15	6	9	70.5	127.5	99	92	1	
700	15	8	9	69.5	142	115	117		1
701	15	10	9	64.4	114.5	75	75	1	
702	15	11	10	60.4	84.5	48	50	1	
703	15	10	10	64	128.3	133	128	1	
704	15	8	10	64	111.5	87	73	1	
705	15	0	10	64.9	103.8	69	72	1	
706	15	7	10	66.3	111	92	68	1	
707	15	10	10	67.5	127.5	110	104	1	
708	15	5	10	70.4	164.5	150	118	1	
709	15	8	11	69	126.8			1	
710	16	1	6	65	123.5	122	102	1	
711	16	5	7	67.3	129.5	102	86	1	
712	16	4	7	71.9	140	111	95	1	
713	16	4	7	67.6	129	103	88	1	
714	16	4	7	68.1	146.5	123	111	1	
715	16	1	8	67.3	117	80	83	1	
716	16	1	8	65	112.5	85	91		1
717	16	6	8	67.3	135.5			1	
718	16	9	8	69.1	137	114	101	1	
719	16	11	8	70.4	152	132	109	1	
720	16	2	8	71	139	130	111	1	
721	16	1	9	72	168.3	125	120	1	
722	16	7	9	66.3	137	122	102	1	
723	16	11	9	68.3	126	120	117	1	
724	16	2	10	64.8	109.3	91	92		1
725	16	0	10	68.6	124.8	92	90	1	
726	16	2	11	69	160	121	100	1	
727	17	4	9	66.8	137.8	114	108	1	
728	17	3	9	65.6	124	111	107	1	
729	17	6	10	67.1	118.5	103	88	1	
730	17	5	10	69.6	125	110	101	1	
731	17	6	12	70.1	148	140	92	1	
732	17	11	12	72	150	123	112	1	
733	18	0	9	69	132.5	121	113	1	
734	18	6	11	71.8	159	124	101	1	
735	18	5	11	69.8	138	103	98	1	
736	19		12	69.3	140	133	125	1	

TABLE XXXIV

Normal Boys

Memory—Perception—Mazé

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
507					21	23	14	45	21	103
517					15	23	23	87	30x	155
518							14	34	22	94
519						17				
520	5–1	4–1	6	4	28	22	14	13	17	21
521					13					
522	7	4	3–1	3	35	38	23	44	30x	81
526					23	16	4	1	4	0
527					29	29	21	50	30x	167
528					31	22	13	18	21	94
529					26	19	14	73	25	131
530					38	32	17	46	30x	147
531					26	16			19	67
532					17	18	8	2	8	4
533					15	18	13	22	24	83
534					31	24	18	38	30x	151
535					21	29	10	10	20	70
536					10	13	20	66	26	113
537					22	15	8	0	14	11
538					23	22	21	67	30x	146
539	8	7	4	5	17	23	7	2	12	14
540	8	7–2	6	8–1	28	24	6	0	12	9
541	5–1	7	6		29	29	11	14	18	41
542					12	18	15	36	12	22
543						24	13	20	20	38
544					28	16	12	32	14	36
545					27	23	20	85	30x	146
546					33	28	30x	192	27	118
547					28	29	19	72	19	50
548					25	23	30x	177	24	107
549	8	7	7	4–2	32	26	23	53	30x	92
550	7	6	6	4–1	26	26	17	18	26	64
551	3–1	3	4	3	36	39	27	107	30x	120
552					33	29	18	37	25	70
553	6	6	7–2	3	32	33	23	61	30x	103
554	4–1	4–1	6	4–2	38	23	16	23	21	50
556					22	37	16	36	19	81
557					12	15	7	8	11	8
558					12	15	12	19	14	14
559					20	32	23	78	30x	167
560					28	19	7	8	8	8
561	6–1	3	5	5	29	41	12	5	14	12
562	6	2	6	3–1	27	31	11	21	15	28

TABLE XXXIV—*Continued*

NORMAL BOYS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
563	7	6	6	5	34	31	17	64	30x	145
564	6	6–1	7–1	6–1	27	31	18	40	30x	100
565	6	8–1	5–1	7–3	34	28	16	32	30x	120
566	4–1	5	4–4	4	22	31	12	33	17	74
567	5–1	6	7	3	F	33	14	17	18	41
568	3–1	3–1	4	3	29	34	15	17	24	64
569					17	21	19	79	30x	112
570					26	33	25	109	30x	124
571					24	47	22	86	16	39
572					27	33	21	102	20	69
573					31	30	30x	154	30x	167
574	6	8–1	6	5–1		32				
575					20	25	17	19	20	42
576	6–1	6	5–1	5–1	34	42	21	24	30x	76
577	6	4	6–1	3–1	32	39	24	65	30x	120
578	5	4	5	4	27	23	12	4	11	3
579	8–1	10–2	5–4	6–1	47	34	18	12	12	2
580					32	28	11	4	15	15
581					24	16	26	75	30x	93
582					44	35	30x	60	30x	75
583					40	32	16	7	26	41
584					17		12	22	15	31
585						23				
586	4	5–1	7	4		20				
587	6	5	5	4	30	35			7	1
588	5	3–1	6–1	3–1		24				
589	5	5	4–2	5	26	31	19	54	30x	134
590					25	28	27	139	20	83
591					48	46	19	36	30x	95
592	4	4	3	1–1	24		23	69	30x	129
593	6	8	6–2	4–1	27	33	7	1	12	5
594	6–1	4	4	2–3	39	45	18	48	28	130
595	7–1	6–2	5–3	6	32	34	17	14	11	3
596	8–1	7	7–3	6–1	55	53	20	21	12	8
597	6	7	4	4	40	36	20	75	15	15
598	8–1	8	8	6–1	45	44	30x	71	19	8
599						37	10	0	21	21
600					30	29	22	46	6	0
601	8	6	5	6	49	50	13	3	15	4
602					16	22	18	72	30x	125
603					16	27	12	22	13	32
604	6	8–2	5	6	19	23	13	11	16	15
605	5	6–1	7	3	33	36	27	54	30x	75
606	5–1	8	6–2	3–2	26	30	29	86	30x	141
607	9–1	9–1	8	9	43	42	28	47	19	12
608	8–1	10	8	7–1	32	27	12	3	12	5

TABLE XXXIV—*Continued*

NORMAL BOYS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
609	8	7	7	7–2	44	35	14	5	18	3
610	6	7	6–1	7	43	36	19	14	12	3
611	9	8	6–1	6	27	21	9	0	7	0
612	6	9	7–1	6	44	46	15	8	11	2
613					44	35	19	30	30x	99
614	8	9–1	6	8	34	25	13	7	12	2
615	9	7–1	8–1	7	51	53	9	0	11	0
616	17–1	9	6–1	6–2	48	34	19	5	19	14
617	0	8	6	5	45	36	8	0	9	0
618	9	7–2	7	8	45	56	10	0	19	15
619	9	9	7	6		40	13	0	15	7
620	7–1	6–3	5–1	5	50	36	17	7	27	58
621					26	24	22	63	16	25
622	7–1	9	4–2	3	42	49	30x	50	30x	68
623	8	10	7–2	7–1	42	57	17	8	11	1
624	9–1	7	6–1	7–1	47	35	7	0	8	0
625	8–2	9–1	8–2	8–2	28	26	10	1	10	2
626	7–1	6	6	6–1	46	41	16	4	15	0
627	7	8–1	8–2	5–4	43	33	15	16	12	2
628					43	44	30x	98	30x	129
629					40	34	28	68	30	70
630	6–1	8	5	6	46	34	26	56	22	38
631	5–1	7			42	41	15	8	30x	132
632	8	7	5	6–1	31	23	18	5	16	4
633	7	8	4–1	5	50	48	12	14	24	63
634	9	10	7	6–1	47	37	20	38	21	47
635	8	7–1	5–1	6	44	46	30x	101	30x	109
636	7–2	9	9	8–1	46	35	6	1	14	7
637	6–1	8	8	6–1	47	40	12	1	12	6
638	9–1	8	7	5–1	42	48	21	16	26	27
639					40	43	16	9	15	1
640					50	50	13	3	18	5
641					60	49	13	2	17	4
642					51	45	23	28	19	12
643					43	32	15	23	18	20
644					27	25	22	9	18	8
645	7	6–1	6	5–3	28	32	16	14	18	29
646					59	53	20	8	24	22
647	8	6	5	7	47	48	30x	108	26	58
648	8	7–1	5	5	42	50	23	18	19	8
649	6–1	8–1	4–2	4–2	53	55			15	4
650	9	9–1	9	5	44	42	18	29	20	36
651	9–1	6–4	5	7–2	31	35	12	2	12	3
652					47	45	11	0	16	1
653					43	39	29	53	30x	50
654					49	47	27	49	30x	83

TABLE XXXIV—*Continued*

NORMAL BOYS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
655					40	29	10	1	10	0
656					53	41	27	28	18	2
657					49	45	20	24	13	7
658					53	46	15	5	15	8
659	4	4	6–1	4–1	46	46	15	11	29	82
660	7	8	6	5	48	44	30x	91	30x	112
661	7	8–1	7	4	38		16	19	12	8
662	7	7	6–1	5	40	42	8	2	7	0
663	4–2	5–1	6–2	5–1	46	39	17	6	23	28
664	8	8	6–1	7	40	42	11	2	8	0
665					39	33	12	7	14	14
666						37	15	11	30x	101
667					64	62	30x	75	16	4
668	8–1	8–1	8	7–1	46		30x	53	21	31
669	7–1	7	6–1	7	58	44	21	22	21	24
670	5–1	7–2	6	6–2	50	45	11	4	8	0
671	7–1	9–1	7	6–1	56	54	30x	114	26	59
672	7	7–1	4	3	29	34	11	3	11	2
673	8	9–1	6	6	32	37	12	2	12	0
674	9	9	6	7	50	49	17	9	16	11
675	10	9	5–3	7	49	36	20	8	18	11
676					47	50	18	11	16	5
677					32	49	13	3	20	15
678					45	42	23	35	12	0
679						39				
680					53	49	30x	95	24	48
681						43			8	0
682					64	60	30x	60	30x	67
683						47	8	0	9	0
684	9	6–4	7–3	8–1	30	39	21	22	17	7
685					33	48	12	2	6	0
686	8	8	7	7	44	47	29	75	27	82
687	5–1	6	6	6–1	45	39	12	0	7	0
688					48	43	14	1	18	6
689					43	33	17	8	17	6
691					47	44	15	2	18	2
692					48	48	25	57	23	41
693					50	45	12	0	14	0
694					62	49	6	0	12	2
695					49	47	12	3	9	0
696						48	17	12	19	12
697						48	13	3	10	3
698					57	46	19	3	17	3
699					63	44	17	10	13	2
700						42	30x	150	30x	114

TABLE XXXIV—*Concluded*

NORMAL BOYS

Memory—Perception—Maze[1]

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
701					63	38	8	1	11	1
702					51	42	19	2	22	5
703					55	54	20	6	22	4
704					67	74	25	8	17	1
705					52	54	28	39	19	4
706					60	57	17	3	29	21
707					65	56	27	21	24	24
708					47	42	21	13	21	10
710	6–2	6–3	6–1	7	22	45	24	59	21	32
711					28	21	25	78	26	84
713					45	47	16	5	28	43
714					56	75	16	4	12	0
715					53	60	27	34	27	40
716					58	43	9	0	10	0
718					49	50	13	0	14	0
719					48	50	19	23	15	5
720					45	49	30x	62	18	14
721					62	46	30x	118	30x	135
722					49	49	14	0	16	2
723						61	21	16	21	9
724									14	2
725					72	69	19	3	19	5
727					69	74	28	46	19	4
728					62	55	16	5	21	13
729					61	54	24	11	21	3
730					70	66	30x	41	16	3
733						72	15	2	21	18

TABLE XXXV

NORMAL GIRLS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
801	6	11	1	47	41	9	9	1	
802	6	7	1	49.5	56	18	18	1	
803	6	9	1	45.8	45.5	10	10	1	
804	6	9	1	46.8	42.5	24	20	1	
805	6	9	1	47.8	47	13	10	1	
806	6	5	1	47	45	15	12	1	
807	6	7	1	43.8	42	12	15	1	
808	6	11	2	50.1	51	35	18	1	
809	6	10	1	50.6	61.5	15	10	1	
810	7	4	1	48	44	16	12	1	
811	7	4	1	49.8	54	19	21	1	
812	7	2	1	49.1	53	28	20	1	
813	7	7	1	48.3	44	11	10	1	
814	7	8	1	48.5	46	17	15	1	
815	7	11	1	53.3	62.5	30	23	1	
816	7	11	1	58.8	45	11	9	1	
817	7	5	1	45	43	9	12	1	
818	7	2	1	50.5	51	15	18	1	
819	7	9	2	52.3	60	21	24	1	
820	7	4	2	48.3	55	18	15	1	
821	7	11	2	48.4	51	27	27	1	
822	7	10	2	45.3	46	13	11	1	
823	7	4	2	45.5	41	8	17	1	
824	7	7	3	50.4	65	24	28	1	
825	7	11	3	50.3	49	20	15	1	
826	7	10	3	50.3	62.5	12	12	1	
827	8	1	1	46.8	46	14	13	1	
828	8	8	1	52.6	52	27	28	1	
829	8	2	1	47.3	60.5	12	16		1
830	8	0	2	46.3	43	10	12	1	
831	8	3	2	49	51	22	23	1	
832	8	4	2	48	48	20	20	1	
833	8	4	2	46.5	43	22	17	1	
834	8	7	3	51.3	54	15	20	1	
835	8	2	3	53.4	70	28	25	1	
836	8	10	3	47	46	17	16	1	
837	8	10	3	49.3	53	22	28	1	
838	8	8	3	50	52	18	20	1	
839	8	11	3	54.3	62	29	21	1	
840	8	9	4	52.3	56	18	22	1	
841	8	5	4	52	55	24	26	1	
842	8	5	4	55	59	28	28	1	
843	8	11	4	57.3	74	38	39	1	
844	9	1	2	52.9	59	24	22	1	
845	9	4	2	46.3	46	14	13	1	

TABLE XXXV—*Continued*

NORMAL GIRLS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
846	9	8	2	52.3	67	35	30	1	
847	9	9	2	52.9	57	29	34	1	
848	9	5	2	52.3	57	30	27		1
849	9	10	2	52.5	54	20	20	1	
850	9	1	3	46.8	51	11	11	1	
851	9	0	3	49.5	59	28	24	1	
852	9	9	3	50.4	52	18	18	1	
853	9	3	3	51.5	60	24	20	1	
854	9	4	3	52.1	68	38	34	1	
855	9	10	3	51.9	64	30	28	1	
856	9	5	3	53.5	64	31	28	1	
857	9	2	3	52.8	80	33	35	1	
858	9	4	3	57	78	38	28	1	
859	9	2	3	53.5	61.5	22	25	1	
860	9	2	3	46	91	21	10	1	
861	9	3	3	48.8	55	22	28	1	
862	9	6	3	50.3	46	27	18	1	
863	9	2	3	50	59	32	31	1	
864	9	5	4	54.3	54	30	24	1	
865	9	0	4	55	63	28	28		1
866	9	0	4	54.8	60	22	27	1	
867	9	3	4	54.1	63.5	30	26	1	
868	9	8	5	53.3	58	14	18	1	
869	9	10	5	56	71	31	31	1	
870	9	10	5	53.4	62	34	31	1	
871	10	2	1	54.5	65.5	22	27	1	
872	10	2	3	50.3	59	30	25	1	
873	10	2	3	49.8	52	18	13	1	
874	10	7	3	52	63	25	24	1	
875	10	5	3	52.3	65	32	26	1	
876	10	2	3	51.5	53	28	26	1	
877	10	0	3	52.1	55	22	26		1
878	10	0	4	54	62	28	28	1	
879	10	8	4	57.5	83	41	40	1	
880	10	0	4	54.4	63.5	30	28	1	
881	10	2	4	58.3	76	40	40	1	
882	10	8	4	55.5	68	25	30	1	
883	10	10	5	53.4	62	39	27	1	
884	10	6	5	56.1	63	26	25	1	
885	10	8	5	57.5	78	43	45	1	
886	10	2	5	55.5	70	42	50	1	
887	10	7	5	55.4	61.5	30	29	1	
888	10	11	5	58.4	86	38	31	1	
889	10	3	5	56	68	21	25	1	
890	10	11	5	58.5	73	33	35	1	
891	10	3	5	57	81	40	50	1	
892	10	7	6	56.5	69.5	28	27	1	

TABLE XXXV—*Continued*

NORMAL GIRLS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
893	11	8	1	51.3	58.5	30	28	1	
894*	11	5	1	49.8	50	19	24	1	
895*	11	5	1	48.9	49	22	22	1	
896	11	4	4	60.5	77	40	42	1	
897	11	0	4	56	71	38	33	1	
898	11	4	4	56.9	67	28	30	1	
899	11	1	5	53	63	28	30	1	
900	11	7	5	54	63.5	36	34	1	
901	11	10	5	57.9	78	53	45	1	
902	11	11	5	60.9	89	57	47	1	
903	11	3	5	54.4	63.5	18	34	1	
904	11	3	5	59.1	110.8	61	60	1	
905	11	2	5	55	67	38	28	1	
906	11	9	5	64	151	78	65	1	
907	11	10	5	52.6	62	22	23	1	
908	11	6	5	54.5	67	37	32	1	
909	11	8	6	54.3	71	57	42	1	
910	11	11	6	58.3	78	33	38	1	
911	11	7	6	58.5	73	33	32	1	
912	11	8	6	59.6	80	50	33	1	
913	11	8	6	56.3	69	40	37	1	
914	11	7	6	54.3	63	27	30	1	
915	11	8	6	59	78	40	35	1	
916	12	11	3	56.9	85	58	52	1	
917	12	5	5	57.4	77	40	50	1	
918	12	5	5	59	95	47	47	1	
919	12	0	6	55.9	63	32	30	1	
920	12	3	6	58.6	105.3	45	48	1	
921	12	10	6	60.9	106.8	65	65		1
922	12	7	6	60.8	108.3	80	72		1
923	12	1	6	61.3	73.5	51	42	1	
924	12	6	6	61.3	89.5	60	55	1	
925	12	8	6	56.3	66	30	25	1	
926	12	11	6	56.4	77.5	32	39	1	
927	12	1	6	54.5	70	21	22	1	
928	12	2	6	60.6	83	54	45	1	
929	12	3	6	58	79.5	42	44	1	1
930	12	3	6	60	90	52	58	1	
931	12	5	6	60.3	94.5	70	58	1	
932	12	5	6	62.5	110.3	73	69	1	
933	12	8	6	63.6	102	60	51		1
934	12	5	6	57.4	103.5	43	38	1	
935	13	6	4	61.8	104.5	67	73	1	
936	13	2	5	60.5	78	48	43	1	
937	13	2	5	60.4	86	42	49	1	

*Numbers 894 and 895 are twins.

TABLE XXXV—*Continued*

NORMAL GIRLS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
938	13	2	6	54.8	61.5	45	41	1	
939	13	1	6	61.5	90.5	52	50	1	
940	13	10	6	58.8	85	55	48	1	
941	13	3	6	62.4	97.5	60	47	1	
942	13	3	6	62.6	96	58	63	1	
943	13	3	6	62	88	48	47	1	
944	13	5	6	57.8	64.5	30	29	1	
945	13	1	6	59.3	101.5	58	60	1	
946	13	10	6	59.6	72.5	54	44	1	
947	13	9	6	65.8	104.3	78	69	1	
948	13	9	6	63.8	100	68	69	1	
949	13	7	7	58.4	88	58	50	1	
950	13	0	7	58.3	82.5	44	34	1	
951	13	2	7	60.5	93	60	50	1	
952	13	5	7	59.3	80	51	49	1	
953	13	2	7	59	76	40	37	1	
954	13	11	7	60	98	52	51	1	
955	13	9	7	62.8	82	38	38	1	
956	13	10	7	61.4	92	62	40	1	
957	13	10	8	61.3	89	53	42	1	
958	13	8	8	59.5	79.5	44	38	1	
959	13	6	8	64	93	52	35	1	
960	13	2	8	64.6	115	67	56	1	
961	13	8	9	62.5	90	58	51		1
962	14	4	6	61.4	85	65	52	1	
963	14	2	6	61.1	117.5	80	75	1	
964	14	2	6	62.6	100	58	50	1	
965	14	8	7	56.3	78.5	32	22		1
966	14	3	7	60.5	106.3	79	70	1	
967	14	11	8	59.6	101.3	71	62	1	
968	14	0	8	60.5	88	48	49	1	
969	14	4	8	59	86.5	60	57	1	
970	14	1	8	60.6	82.5	50	40	1	
971	14	5	8	61	100	72	74	1	
972	14	1	8	62.3	97	62	69		1
973	14	5	8	66.9	102	83	86	1	
974	14	0	8	64.1	107.3	60	62	1	
975	14	1	8	65.9	117.8	70	60	1	
976	14	6	8	65.8	110	79	73	1	
977	14	4	8	70.3	106.5	73	70	1	
978	14	11	8	67.8	116.5	75	72	1	
979	14	2	8	65.3	146.5	71	64	1	
980	14	11	9	63.3	90	43	48	1	
981	14	11	9	66.1	123.5	69	51	1	
982	15	0	3	62.8	102.3	72	67	1	
983	15	3	5	61.8	98	53	58	1	
984	15	6	6	59.3	94			1	

TABLE XXXV—*Continued*

NORMAL GIRLS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
985	15	1	6	62.5	105.8	60	70	1	
986	15	9	6	62.4	102.3	83	77	1	
987	15	8	6	61.3	98	55	60		1
988	15	4	6	66.3	102.8	64	63	1	
989	15	0	7	57.8	79	38	40	1	
990	15	10	7	64.5	93	65	57	1	
991	15	4	7	65.8	104.5	65	57	1	
992	15	7	7	62.4	126.8	93	89	1	
993	15	0	7	59.5	96.5	68	48	1	
994	15	3	8	59.8	94	67	57	1	
995	15	1	8	63.5	101.5	58	48	1	
996	15	1	8	63.4	105	75	68	1	
997	15	4	8	64.8	122.3	82	80	1	
998	15	11	8	65.1	102	69	62	1	
999	15	2	9	62.9	137	72	85	1	
1000	15	9	9	65	109	61	62		1
1001	15	10	9	65.8	120.3	69	58	1	
1002	15	5	9	63.4	117.3	81	75	1	
1003	15	10	9	62	112.8	82	68	1	
1004	15	9	9	66.6	120.5	82	92	1	
1005	15	6	10	61.1	117	81	71	1	
1006	15	9	10	69.1	120.5	71	55	1	
1007	15	5	10	69.8	140	90	82	1	
1008	15	9	11	64.5	94			1	
1009	15	10	12	63	104.3			1	
1010	16	4	6	61.4	113.8	50	58		1
1011	16	0	8	67.5	112.5	71	65	1	
1012	16	0	8	66.1	120	84	80		1
1013*	16	7	8	61.8	97	61	60	1	
1014	16	6	8	67.3	114	94	84	1	
1015	16	3	9	62.3	173.8	62	62	1	
1016	16	1	9	66.8	114	74	70	1	
1017	16	1	9	67.6	130	73	71	1	
1018	16	4	9	65.4	107.5	72	62	1	
1019*	16	7	9	61.5	99	68	53	1	
1020	16	2	10	59	106.5	78	53	1	
1021	16	3	10	65	124	68	64	1	
1022	16	4	10	61.8	118.5	93	80	1	
1023	16	0	10	63.3	113.5	74	68	1	
1024	16	11	10	65	129	72	68	1	
1025	16	0	10	64.8	105	70	69	1	
1026	16	3	10	68.6	136	84	75	1	
1027	16	5	11	64.3	95			1	
1028	16	4	11	63.5	111.5			1	
1029	16	10	11	63.8	119.5			1	
1030	17	4	6	62	123.5			1	

*Numbers 1013 and 1019 are twins.

TABLE XXXV—*Concluded*

NORMAL GIRLS

Individual	Age		School Grade	Height Inches	Weight Pounds	Grip (Pounds)		Handed	
	Yrs.	Mo.				R. H.	L. H.	R.	L.
1031	17	4	9	64.6	115.8	78	73	1	
1032	17	1	9	64.4	112	63	54	1	
1033	17	11	11	64	115			1	
1034	17	7	11	58.6	93			1	
1035	17	8	12	62.6	108.3			1	
1036	17	11	12	66	121.3			1	
1037	17	8	12	65	138.8			1	
1038	17	11	12	68	148			1	
1039	17	0	12	65.3	121			1	
1040	18	4	8	65	112	72	68	1	
1041	18	1	9	66.5	125.8	74	82	1	
1042	18	10	12	65.8	121.5			1	
1043	18	9	12	65.5	101.8			1	
1044	19	0	12	62.3	120.5			1	
1045	19	2	12	68.5	136.8			1	

TABLE XXXVI

NORMAL GIRLS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
808					23	26	14	43	14	35
819						25				
820					22	28	11	15	12	14
821						15				
822					19	23	4	0	8	6
823						17				
824	4	7	6–1	4–6	35	41	30x	98	30x	135
825						33	30x	144	30x	161
826					26	25	21	78	17	42
830					27	31	17	36	20	46
831					16	14	9	8	16	23
832						30				
833					16	21	5	8	15	37
834	8	9	7	6	38	32	16	43	27	113
835	6–1	2–1	6–2	6	32	21	12	20	12	17
836	7	6	5	6		20				

TABLE XXXVI—*Continued*

NORMAL GIRLS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
837					22	27	21	45	14	8
838						21	12	10	11	11
839					21	16	12	18	9	7
840	8	8	8–1	7–2	48	47	19	8	30x	41
841	7	8	6	6	32	35	17	10	30x	87
842	8	8	9–1	8	49	53	30x	80	30x	87
843				7	46	45	17	18	30x	89
844					37	34	13	8	30x	92
845					20	27	12	19	18	47
846					30	28	19	48	19	30
847					18	23	10	8	23	74
848					21	24	17	48	25	108
849						F	8	6	18	49
850	2–2	5–1	4	4–2		16				
851	9–1	6–1	7	7–1	32	43	14	30	25	89
852	4	7–1	7	4–1	28	26	17	24	24	90
853	4–1	2–1	5	5	44	36	11	3	18	35
854	8–1	7	5	7–1	25	27	5	0	6	0
855	4–1	4	6	6	22	25	5	3	10	10
856	8	6–1	5–1	7–1	20	30	20	32	30x	89
857		7			26	30	11	14	13	19
858	9–1	5	7–1	9	50	45	12	14	14	29
859	4-1		4	3		12				
860					43	46	30x	172	30x	173
861					27	34	25	105	30x	154
862						36	24	96	30x	130
863					25	28	16	25	16	21
864	8	7	5	6	31	25	7	3	13	9
865	7	8	8	6		32				
866	6	5–1	6	3	36	33	23	34	30x	129
867					38	34	27	80	30x	105
868	7	8	5	5	34	23	15	19	15	24
869	8	8	6	6	45	33	11	0	12	3
870					43	41	19	19	20	28
872	7	6	4–1	6	39	47	9	3	19	24
873	7	5–1	4	4	39	39	14	29	21	58
874	9–1	7–1	7–1	5	28	34	14	20	19	50
875	8	7–3	8–1	6–2	42	48	9	3	12	12
876					39	33	18	46	15	11
877					23	32	18	52	17	40
878	8	8	6	7	46	37	30x	118	30x	133
879	7	6	6	7	38	42	30x	78	30x	96
880	8	7–1	5–1	6–2	44	43	30x	88	30x	144
881	3	3–1	5–2	F	27	34	19	32	30x	74
882	4	6	5–1	5	32		15	13	30x	130

TABLE XXXVI—*Continued*

NORMAL GIRLS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
883	8–1	9–1	8	6		35	15	8	19	26
884	9–1	8–1	8–1	8–1	38	35	30x	87	19	10
885	8	8–1	7–1	7–1	48	36	14	11	12	11
886					49	36	30x	59	26	55
887					45	44	24	63	30x	112
888					21	25	12	3	10	0
889					45					
890					51	42	30x	104	30x	164
891					43	45	18	21	29	96
892					41	41	7	1	5	0
896	8	7	8	7	44	33	14	14	23	55
897						33				
898	7		5–1	5–2	39		28	77	30x	125
899	5	8	3–1	5	40	36	17	14	12	3
900	6	6	7–1	4–2	47	29	19	31	21	58
901	7	7–2	4–3	7–1	46	40	14	2	15	2
902	6–1	8–1	8	6–1	47	43	22	13	25	23
903					30	26	24	17	30x	76
904					50	49	20	32	27	66
905					41	42	28	52	30x	60
906					45	40	27	56	28	67
907					36	33	5	0	11	4
908					28	31	16	17	19	18
909						49				
910					49	42	28	36	14	2
911	9	8–1	6	7	51	50	12	3	10	0
912	6–2	6–1	6	7	46	32	18	35	16	21
913	6	8–2	6–1		43	34	19	15	19	21
914	8	9	6	7	49	54	13	4	17	5
915	7	6–1	7	5–2	51	50	13	2	19	9
916	6–1	9	3	6	21	27	12	15	14	28
917					43	45	21	31	25	47
918					39					
919	6	7	6	5	43	38	17	12	15	4
920	9	8	9	6	49	47	10	0	8	0
921	8–1	8–1	9–1	7–1	55	53	14	13	11	5
922	6	8	7–3	7–2			10	0	12	0
923	8	9–1	8	7	47	41	17	17	14	10
924	6	8	7	5	52	56	16	4	16	11
925	10	9–1	8	6–2	52	45	7	0	7	0
926	8	9–1	6		59	61	21	23	21	12
927	5	8	5	7	47	37	24	25	15	7
928	9–1	9–1	9–1	8	49	50	8	0	12	0
929	9–1	10–1	6	6	43	49	17	6	18	22
930	8	8	6	7	50	49	17	9	19	13
931	7–1	8–1	6	5	41	34	16	10	18	3
932	8	9	7	7	57	49	9	0	12	2

TABLE XXXVI—*Continued*

NORMAL GIRLS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
933	8–2	9–1	5	6–1	47	47	13	5	13	4
934	7–1	7–1	6	6	43	45	19	17	28	37
935	8	6–1	6–1	6	38	26	14	8	27	69
937	5	7	6	5–1	45	39	7	0	8	0
938	7–1	6–1	5	6–1	46	36	11	2	5	0
939	8	9–1	7–1	6–3						
940	9	6–1	7	8		45	17	1	11	0
941	9	7–1	8	7–1	45	49	17	8	13	0
942	5	7–1	6–1	5–1	32	44	6	0	11	0
943	9	9	7	6–1		46	17	21	30x	70
944	7	9–1	6–1	7–1		62	7	0	13	3
945	8	8–1	6–1	6–1	54	50	9	0	11	1
946	7–1	9	6–1	7	40	36	12	4	12	4
947	9	9	7	8	47	47	9	0	18	4
948	9	10	7	10		46	13	9	16	4
949					52	45	29	94	28	91
950					34	32	14	6	15	4
951					48	48	19	7	17	8
952					43	30	20	26	19	14
953					46	41	21	7	26	22
954					49	40	23	28	10	2
955					57	54	15	8	11	2
956					52	46	26	51	30x	83
957					49	44	24	26	15	5
958					49	48	15	5	12	2
959					58	60	12	0	12	0
960					60	45	16	18	19	28
961					55	48	19	4	18	5
962	8–1	7–3	9	6	43	45	12	2	12	0
963	8	8–3	9–1	7–1	62	49	11	0	14	0
964	10	8–1	6–1	6–2	48	53	25	23	18	11
965					54	51	13	7	16	16
966					49	50	29	64	19	16
967					66	50	10	1	13	4
968					45	45	25	70	26	69
969					68	61	14	6	12	0
970						66	30x	64	28	63
971					45	52	19	16	21	8
972					48	46	30x	46	26	18
973					64	60	30x	69	30x	39
974					61	57	30x	72	26	34
975					65	62	13	3	14	0
976					46	46	9	0	10	0
977					55	44	20	15	18	5
978					52	49	21	12	19	16
979					78	52	11	0	13	2
980					61	45	26	40	12	1
981					69	56	23	42	23	31
982						56	20	75	19	61

TABLE XXXVI—*Concluded*

NORMAL GIRLS

Memory—Perception—Maze

Individual	Memory Word				Perception Letter		Maze			
	Related		Unrelated				1		2	
	A R-W	B R-W	A R-W	B R-W	1 A's	2 B's	Amount	Touches	Amount	Touches
983	8–1	9–1	8–2	6	49	65	22	8	20	12
985							8	0	14	0
984	8	9	9–3	6–1	50	53	27	52	25	54
986	9	8–2	7	8–2	48	54	10	0	12	5
987	8	9	7	7–1	34	35			23	29
988	6–1	8–1	7	7	59	55	24	41	27	66
989					47	42	7	0	11	0
990					54	50	11	0	18	4
991					48	35	12	0	12	4
992					49	43	25	16	26	36
993						46				
994					45	33	18	17	14	5
995					64	55	19	14	21	15
996					50	48	13	0	14	1
997					75	50	17	4	16	1
998						55	17	2	14	0
999					63	57	25	30	24	11
1000					49	46	13	6	18	18
1001					91	66	28	60	20	25
1002					73	55	17	4	21	22
1003					69	50	18	12	21	3
1004					78	61	21	2		
1005					57	52	23	20	29	36
1006					55	49	17	11	19	9
1007						45	23	25	30x	98
1010	6–1	6	4–1	8	49	48	13	12	15	12
1011					52	44	22	33	30x	60
1012					53	45	26	20	24	12
1013					47	38	9	3	10	4
1014					48	47	21	22	19	26
1015					78	57	19	10	24	16
1016					63	50	17	7	14	2
1017					60	47	9	0		
1018					53				19	9
1019					84	53	27	59	19	7
1020					70	50	17	10	28	28
1021					62	51	17	7	17	10
1022						70	11	2		
1023					53	47	13	0	13	0
1024					65	48	16	3	19	2
1025					61	53	26	30	19	9
1026					62	53	18	8	15	3
1030							20	23	24	39
1031					53	45	16	1	13	1
1032					69	49	12	9	12	3
1040					48	45	16	4	9	0
1041					85					

VITA

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